Practical Apparatus Management and Driver-Operator Training for Volunteer Personnel

of Sweetwater County Fire District #1

Executive Development

James K. Wamsley
Sweetwater County Fire District #1
Rock Springs, Wyoming

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Certification Statement:

I hereby certify that this paper represents my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: ________________________________________________

James K. Wamsley
Abstract

The problem was that Sweetwater County Fire District #1 (Fire District #1) had no plan for training drivers from the volunteer contingent, managing apparatus safety, response policies, or minimum set of skills required to drive apparatus and operate the same piece of equipment on scene. The purpose of this research was to define and establish a program which organizes and maintains industry best practices as they applied to the training of Fire District #1 personnel and management of fire apparatus operations. The descriptive research method was used to determine what the essential components of an apparatus training and management plan were, reviewing relevant fire service programs already in existence in similar fire service organizations and private enterprise. The upkeep requirements were also researched with regard to normal business practices in private enterprise and recommended fire service practices from relevant sources. A literature review was conducted to define the elements of an effective apparatus management and driver-operator training program. Wyoming Statutes and relevant literature from fire service oriented sources were consulted as well as private corporations which managed and trained drivers of vehicles similar to those normally operated in the fire service. A questionnaire was sent out to 84 fire departments of similar size and organization to Fire District #1 to describe common programs. The results showed that most fire departments had some sort of apparatus management and training program formalized, and that private industry relied heavily on training, education, and health and safety programs to ensure the safety and efficiency of their operations. The recommendation of this effort was that Fire District #1 adopt a comprehensive apparatus management and training program which adheres to accepted national standards. This
program would be developed by the officers and leaders of the organization. The program would be a periodically reviewed living document.
Table of Contents

Abstract .......................................................................................................................... 3
Table of Contents ......................................................................................................... 5
Introduction .................................................................................................................. 6
Background and Significance ....................................................................................... 7
Literature Review .......................................................................................................... 12
Procedures .................................................................................................................. 27
Results ......................................................................................................................... 34
Discussion ................................................................................................................... 42
Recommendations ....................................................................................................... 47
References ................................................................................................................... 51

Appendices

Appendix A: Interview with J. Eaker, UPS Fleet Safety Manager ......................... 56
Appendix B: Interview with S. Scott, Center for Transportation Safety ............... 59
Appendix C: Apparatus Driver Training Policies Questionnaire Questions ......... 61
Appendix D: Results for Apparatus Driver Training Questionnaire ...................... 64
Appendix E: Elements of an Apparatus Management and Driver-Operator Training Program ................................................................. 67
Introduction

The evolution of the fire service in the United States has brought a tremendous amount of change throughout the many fire departments in the nation as a result of technological advances, standard operating procedures-standard operating guidelines, and other developments too numerous to list. As the fire service has advanced and fire departments progressed from strictly volunteer organizations to combination and then exclusively career departments, the ability to concentrate on training specific to the vocation of firefighting and related duties became a part of the daily schedule, allowing dedicated time to acquire the various skills and knowledge needed to perform the business of emergency response safely and effectively. Combination and volunteer fire departments however do not always have the luxury of devoting large blocks of time to training, and certifying their membership to the same standards, making the process of acquiring and maintaining those same skills and knowledge more challenging.

Many departments still operate on the antiquated position that the fire chief or officer in charge of a particular incident is able to discern who is qualified and who is not qualified to perform certain tasks based on personal opinion or an intuitive gut feeling. Apparatus driver-operator duties is one of these particular items which is often left to the discretion of the individual who assumes the role of incident commander, either on the first-due apparatus, or later arriving equipment to supplement the initial response. The error of this philosophy is demonstrated in the number of line of duty deaths (LODD’s) which are attributed to apparatus crashes each year. The fact that apparatus crashes consistently account for the second largest number of LODD’s indicates that this is an area which requires improvement (National Fire Protection Association [NFPA], 2008a).
The problem is that Fire District #1 has no plan or philosophy for authorizing or training drivers from the volunteer contingent, managing apparatus safety, response policies, or minimum set of skills required to drive apparatus to and from the scene, and operate the same piece of equipment on scene (Sweetwater, 1996). Although Fire District #1 has been fortunate enough thus far to have avoided any accidents involving fire apparatus, and complaints from the public at large, this situation obviously exposes all personnel of Fire District #1 as well as the general public to an unacceptable amount of risk, while creating substantial liability issues for the organization as a whole. The purpose of this research is to identify the elements of a program which organizes and maintains industry best practices as they apply to the training of Fire District #1 personnel and management of fire apparatus operations.

In order to determine the various facets of this issue, the following questions will be considered using the descriptive research method: What are the elements of an effective apparatus management program? What relevant standards exist in private industry regarding driver training and evaluation? What training programs are now in existence in private industry, insurance documents, and fire service programs and organizations which may provide elements for an apparatus management program at Fire District #1? After initial selection and training, what continuing education requirements, or annual training, if any are pertinent?

Background and Significance

Fire District #1 is a combination fire department providing fire and rescue protection for approximately 2000 square miles of Sweetwater County in southwest Wyoming. Established in 1996 out of the existing Sweetwater County Fire Department,
Fire District #1 protects a resident population of approximately 7,500 people and a daily transient population of over 25,000 individuals who drive or commute through the area. The area served by Fire District #1 covers 75 miles of U.S. Interstate 80 (I-80), the busiest highway in the state with over 16,000 vehicles per day passing through, as well as several hundred miles of secondary highways, and rural roads (Wyoming Department of Transportation, 2004). The department retains four full-time career positions: fire chief, assistant fire chief, and two battalion chiefs. The volunteer contingent is authorized up to 45 volunteer personnel, and has six volunteer officers with an equivalent rank to that of fire captain, the current roster has 32 active volunteer personnel. Fire District #1 responds to all fire and rescue hazards, assisting medical crews with life threats and situations where patient access is difficult or compromised. Although not a medical transport agency, Fire District #1 is automatically dispatched to all crashes in the response area due to the immensity of the response area and the extended response times involved. The apparatus compliment of Fire District #1 is listed below.
<table>
<thead>
<tr>
<th>Apparatus Type</th>
<th>Number</th>
<th>Year</th>
<th>Chassis Make</th>
<th>Special Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Rescue</td>
<td>R-505</td>
<td>2000</td>
<td>F-550 Ford</td>
<td>4 X 4</td>
</tr>
<tr>
<td>Rescue Pumper</td>
<td>E-101</td>
<td>1993</td>
<td>Becker</td>
<td>750 gal. water</td>
</tr>
<tr>
<td>Pumper-Tanker</td>
<td>E-202</td>
<td>1997</td>
<td>Pierce</td>
<td>4 X 4, 1500 gal. water, compressed air foam (CAFS)</td>
</tr>
<tr>
<td>Pumper-Tanker</td>
<td>E-203</td>
<td>2003</td>
<td>Pierce</td>
<td>6 X 6, 3000 gal. water, CAFS</td>
</tr>
<tr>
<td>Wildland</td>
<td>E-404</td>
<td>1997</td>
<td>F-350 Ford</td>
<td>4 X 4</td>
</tr>
<tr>
<td>Wildland</td>
<td>E-405</td>
<td>2001</td>
<td>F-550 Ford</td>
<td>4 X 4</td>
</tr>
<tr>
<td>All-Terrain Vehicle (ATV)</td>
<td>None</td>
<td>1999</td>
<td>Polaris</td>
<td>6 X 6</td>
</tr>
<tr>
<td>Command-Support</td>
<td>Squad-1</td>
<td>2007</td>
<td>GMC</td>
<td>4 X 4, 8 passenger</td>
</tr>
<tr>
<td>Command-Support</td>
<td>Squad-2</td>
<td>2008</td>
<td>F-350 Ford</td>
<td>4 X 4, 6 passenger</td>
</tr>
</tbody>
</table>

Figure 1. Apparatus compliment of Fire District #1

Emergency calls are dispatched through the Sweetwater County Sheriff’s Office Dispatch. All active personnel on the fire department carry a radio and are requested to respond to all calls for which they are available. Conditions which prohibit a member from responding include duties concerning their primary employer, any alcohol use within the previous eight hours prior to that time, use of any other substance which could impair the ability of the individual to safely and effectively perform the required duties, and personal issues with which response to the call may interfere (Sweetwater, 1996).

The call volume over the history of the fire district shows an overall increase over time, with an average of 250 responses per year. The majority of those responses are crash-rescue incidents, with wildland fires being the second highest segment of the call volume. Fire District #1 operates out of one fire station situated strategically just off of exit #103, I-80. Most responses require access from I-80. However with a large area prone to wildfires south of the city of Rock Springs, as well as two state highways and several
rural housing developments, apparatus are occasionally obliged to respond through the
city.

Currently, Fire District #1 has very limited training or response policy which
defines any facet of an apparatus training or response management program (Sweetwater,
1996). The Fire District #1 handbook, which all new recruits are issued, contains only the
barest amount of information concerning apparatus driver-operator training, personal
safety or response safety, not even where seatbelt usage is considered. The handbook
does contain explicit language governing the use of personally owned vehicles (POV’s)
and the response in said vehicles, prohibiting the use of emergency lights and sirens on
POV’s, as well as requiring strict compliance with all traffic laws while responding to the
fire station. The only other reference to any type of emergency vehicle operation training
is the requirement that all Fire District #1 personnel attend the annual emergency vehicle
operation course. The content of this course is not specifically defined.

Current statistics concerning LODD’s associated with response and apparatus
Crashes bear out the need for a vehicle training and safety program in all fire service
organizations. According to a recent study on emerging safety and health issues facing
the volunteer fire service, vehicle crashes historically account for approximately 25% of
all LODD’s (U.S. Fire Administration [USFA], 2008). Additionally, statistics year after
year support the conclusion that volunteer firefighters are more likely to be killed while
responding/returning from an incident than are career personnel. In 2005 alone the ratio
of career LODD’s to volunteer LODD’s in this category was five career personnel to 17
volunteer personnel (USFA, 2006b). Statistics compiled by the NFPA for 2006 show that
while injuries occurring while responding-returning accounted for 5.7% of the total
number of fire service injuries, the same category was responsible for 20.2% of the 
fighter fatalities for the same period. These statistics remain relatively proportionate 
for the period of 1977-2006 (NFPA, 2008a; NFPA, 2008b). Over time, data demonstrates 
that although responding-returning incidents represent a minor segment of the injuries, 
they consistently claim a number of lives disproportionate to the overall quantity of those 
same incidents.

This research is being conducted in accordance with the curriculum of the 
National Fire Academy course *Executive Development*, which promotes the use of 
adaptive leadership technique to view problems facing an organization from an outside 
perspective (USFA, 2006a). This practice requires that the responsible fire service leader 
step back from the issue and take a broader look at the current situation to best determine 
the requirements to improve a particular situation, as well as assessment of the actual 
underlying factors regarding the need for improvements. This concept demands that all 
facets of the problem and the solution be taken into account, from applicable standards 
and accepted best practices, to the human element and the best way to present said best 
practices and associated programs for acceptance by department personnel. This research 
will also comply with the following USFA operational objectives: “Reduce the loss of 
life from fire of firefighters; To promote within communities a comprehensive, multi-
hazard risk-reduction plan led by a fire service organization” (USFA, 2008b, p. II-2). 
This research will identify the foundation for a safe emergency vehicle training and 
response policy to protect the members of Fire District #1 during response to fires and 
other emergency situations. The elements of this policy as identified will also protect the
public by presenting a pro-active position for safety during response to those same incidents, thereby reducing the exposure by the same hazards to the general public.

Literature Review

The statutes governing emergency vehicles and licensing requirements were consulted to determine what those requirements may be and which of those standards apply to operation and training of fire apparatus driver-operators. All pertinent regulations can be found in *Wyoming § Title 31, Motor Vehicle Code* (Wyoming, 2008). Most fire apparatus fall into the category which requires a class-b license, those requirements being necessary for any vehicle with a gross vehicle weight (GVW) of 26,001 pounds or greater (Wyoming, 2008). The statute also has a specific exemption for the licensing requirements for operation of fire apparatus. One item of note in the Wyoming Statutes is the presence of various references to the fact that in no way do any of the exemptions or privileges afforded emergency vehicles eliminate the obligation of emergency vehicle operators to operate with due regard for the safety of all persons. Almost every section of the code where any form of emergency vehicle is mentioned states this obligation in some form or another. POV’s used in conjunction with emergency response are also mentioned; however as Fire District #1 only allows response by POV’s direct to the scene by authorized permission of staff only, these references are omitted from this work.

*Wyoming § Title 31, Motor Vehicles* further allows the emergency vehicle “…when responding to an emergency call…” “….but not upon returning from a fire alarm…” to stage apparatus appropriate to the situation, ignore traffic control devices after slowing down for safety, “…exceed maximum speed limits so long as he does not
endanger life or property” (Wyoming, 2008, Wyoming § 31-5-106) and to act without regard to normal turning or direction of travel restrictions. These allowances are followed again by the notice that none of these criteria allow the operator of an emergency vehicle to act without due regard to the safety of the general public. The statute also states explicitly that the law does not absolve the operator of “…the consequences of his reckless disregard for the safety of others” (Wyoming, 2008, Wyoming § 31-5-106).

Notably, Wyoming Statute *Title 31 Motor Vehicles Article 14 Seatbelt Usage* does not exempt the occupants of an emergency vehicle from wearing seatbelts during any phase of emergency or non-emergency response (Wyoming, 2008, Wyoming § 31-5-1402).

The Wyoming Department of Fire Prevention and Electrical Safety (WDFPES), the body which oversees the fire service in the state of Wyoming, references applicable NFPA standards for the firefighter certification requirements. Therefore WDFPES certifications were omitted to avoid duplication of effort. All aspects of training and certification for an apparatus management program are addressed in the following paragraphs concerning NFPA standards.

NFPA standards were reviewed to determine what requirement may exist in that particular set of standards. Fire District #1 has not adopted any NFPA standards officially. However, as the common standard by which all emergency services are expected to do business, these documents will provide a valuable reference base from which to develop any type of emergency vehicle training and management plan. The NFPA is an organization which develops consensus standards for all facets of fire prevention and emergency response. Although not mandatory, nor legally binding; these standards are the guidelines by which each emergency organization are judged, especially
in the arena of civil law (National Volunteer Fire Council [NVFC], 2008b). The review of these standards is therefore pertinent with regards to accepted best practices as well as to the reduction of liability to the organization and those members which are assigned driver-operator duties.

The first standard reviewed was NFPA 1451, *Standard for a Fire Service Vehicle Operations Training Program* (NFPA, 1451) (2007a). This standard provides requirements for policies and procedures with regards to training programs for persons assigned to drive and/or operate fire apparatus; one item of note is the mention of the relevance of this standard to persons responding in personal vehicles, making this standard of particular interest to volunteer and combination emergency organizations. As it applies to Fire District #1, all personnel responding to a call, even though required to respond to the fire station, will still be subject to the information and recommendations of *NFPA 1451*.

Chapter four of *NFPA 1451* (2007a) is of particular note as it establishes the requirement for all organizations to develop and implement a driver training program for all persons who will operate fire apparatus with the explicit purpose of preventing accidents and injury associated with apparatus response and training. Other training needs addressed in *NFPA 1451* include hazard recognition, frequency of training, special conditions such as winter driving, and familiarity with each vehicle the individual may be required to operate. The requirement for departments to establish a risk management program takes prominence as all departments are required to establish formal, written risk management plans for fire service apparatus operations. This standard also refers the reader to NFPA 1500, *Standard on Fire Department Health and Safety Program* (NFPA
NFPA 1500 (2007b) addresses the health and safety of all personnel in organizations providing emergency services. The standard addresses all facets of health and safety for emergency responders, including risk management. As it applies to this effort, NFPA 1500 specifies that the administration of the department develop and implement policies and procedures which conform to the provisions of the standard. These policies and procedures must address the actions, training, and continuing evaluation of performance and responsibilities of the individual as well as the manner in which the same are administrated. The standard demands that each fire department adopt a “comprehensive, written risk management plan” (NFPA, 2007b, p. 11) to address the risks associated with, among other honorable mentions, emergency vehicle operations, under emergent and non-emergent conditions. Based on the content on NFPA 1500, every department must establish effective standard operating procedures (SOP’s) that provide this reasonable set of work conditions for all employees.

NFPA 1500 (2007b) addresses driver-operator training by stipulating that all drivers meet the standards of NFPA 1002 (2003), as well as requiring SOP’s for vehicle response and specifying that only driver-operators who have completed the entire training process, or trainee drivers under direct supervision of personnel qualified as driver-operators be allowed to drive and/or operate apparatus. Chapter six of this standard provides an effective framework for development of apparatus response SOP’s. NFPA 1500 also mandates possession of a valid license for the class of vehicle being operated, which would in most cases indicate possession of a class-b license for most of the Fire
District #1 fleet. This requirement exceeds that of the state of Wyoming as previously discussed.

*NFPA 1002* (2003) qualifies the attributes and skill sets necessary for assignment as a driver-operator, and defines the manner in which each individual will be evaluated. This standard addresses all types of fire apparatus currently operated by Fire District #1. Note that although Fire District #1 does not have any apparatus specifically designed as mobile water supply apparatus, the two pumpers with 1500 and 3000 gallon tanks are operated as such at certain incidents, depending on that specific set of conditions, two of those circumstances would be establishing temporary water supplies for helicopter operations and wildland firefighting endeavors during that season, and establishing water supply at some of the more remote locations within the boundaries of Fire District #1 where no hydrant system exists. *NFPA 1002* provides a blueprint for conformance to *NFPA 1500* (2007b) by furnishing a driving course and a set of operational requirements which comply with the risk management provisions of *NFPA 1500* (2007b). Periodic medical evaluation is required, intervals of one year between evaluations is suggested, but left to the determination of the individual agency. *NFPA 1002* (2003) also specifies that the driver-operator must be trained and able to conduct periodic routine inspections, tests, maintenance and the documentation of the same, as well as being able to operate all accessories and auxiliary equipment on the vehicle. The individual requirements of each section concerning a particular apparatus type outline skills particular to the operation of that vehicle and also that driver-operators be trained and evaluated on apparatus similar to those to which they will be assigned. Knowledge of department SOP’s and the same
licensing requirements indicated in *NFPA 1500 (2007b)* area are also present in this standard.

To sum up the content of these three NFPA standards on this research effort, these documents provide a gold standard for the development, evaluation, implementation, and continuing improvement for any apparatus management plan adopted by Fire District #1 by providing the elements of selection of driver-operator candidates, training requirements specific to each apparatus type, periodic evaluations to verify skills and medical eligibility, and ongoing education to improve and reinforce best industry standards (NFPA, 2003; NFPA, 2007a; NFPA, 2007b).

To round out a review of other pertinent standards applicable to the topic, the *Interagency Standards for Fire and Fire Aviation Operations*, 2008 edition, (National Wildfire Coordinating Group [NWCG], 2002) produced by the NWCG, was consulted for policies and procedures. Although the scope of this document states that it applies to agencies of the federal government, conformance to these standards is an important consideration as Fire District #1 often responds with Bureau of Land Management (BLM) fire crews for fires occurring on both private and public lands. All fire personnel conducting fire operations on public lands, whether they are the authority having jurisdiction (AHJ) or not, are required to abide by BLM policies and procedures when on federal lands. These requirements include certification as an engine operator, also known as *red-carded*, with an arduous designation noted on the official document verifying the qualifications, training, and experience of the card holder. Chapter seven addresses general driving procedures which mirror those mentioned in the aforementioned NFPA standards, as well as certain situations not normally associated with routine fire apparatus
operations as found in rural-urban incidents, such as responsibility for traffic violations, limitations on driving time due to transport between fires, and assigning conformance to these requirements to the engine operator specifically. The items of similarity include use of seatbelts, training, and licensing requirements. This does require the particular class license for the vehicle being operated, as well as any applicable endorsements and that the license be a commercial drivers license (CDL). The recommendations for training are that it be given within three months of assignment with periodic refresher training every three years. Fire District #1 and agencies throughout the state of Wyoming are obligated to these requirements by the local mutual aid agreements between local, county, state and federal agencies. These agreements are reviewed and recertified annually by the signatory agencies within each individual county in Wyoming, binding each agency to certain operational guidelines, levels of training, and procedures, including the items found in the Interagency Standards for Fire and Fire Aviation Operations (NWCG, 2008).

The NWCG as an organization has also developed training and certification curriculum regarding the needs of the wildland firefighter, the best known of these are the red-card qualification wherein the certification, qualifications and experience of the individual are catalogued in a card issued annually to the individual. This card is updated each year with a required annual refresher, and is signed by the chief of the department or agency supervisor as the case may be.

Among the other coursework provided by the NWCG is S-216 Driving for the Fire Service (S-216) (2002). The aim of this class is to prepare the individual firefighter to drive and operate wildland apparatus. The curriculum addresses the content of NFPA 1002 (2003), but doesn’t specifically reference any NFPA standards. The course does
provide specific instruction on the dynamics of wildland fire apparatus operation both on
established roads and in the off-road setting. The content contains information relevant to
human factors, mechanical issues, driving skills and adverse conditions affecting driving
operations. Also included is a battery of tests and evaluations to measure knowledge and
provide hands-on driving experience. In the author’s experience, S-216 is not an
insignificant time commitment, requiring from 28-32 hours of instruction and driving
time. The time spent is very beneficial as practical, in-the-field experience is part of the
instruction. This provides invaluable insight to wildland driver-operator candidates with
little or no prior off-road experience.

Available literature concerning apparatus driver-operator training and
management programs was accessed from the USFA. Four applicable documents were
reviewed beginning with Emergency Vehicle Driver Training (1996a). Published in 1996,
the information contained in this document is somewhat dated, however it does contain
useful information to augment the background knowledge of emergency vehicle
operations instruction. The legal aspects of apparatus operations are discussed in chapter
five, with relevant fire service legal reference material listed for further reading when
developing the risk management policies of apparatus management SOP. As an adjunct
to any driver-operator training program, the text of this document is in an easy to read
and understandable format. The primary application of the information would be
supplemental to any instructor manual, and core curriculum text. The weakness of this
document is that it doesn’t reference any applicable or related NFPA standards
concerning risk management, safety & health, nor apparatus response. As previously
discussed, the NFPA standards provide a gold standard for determining adequate policies and procedures concerning any apparatus management and training program.

In 1996, the USFA also published a text titled *Risk Management Practices in the Fire Service* (1996b). While this reference does not specifically address the issue of driver-operator training, it does provide basis for an official, written risk management program from both an operational and organizational perspective. The risk management process is carefully evaluated and explained in terms of impact to both the department as a whole where organizational risk is concerned, and operational risk as it applies to the safety and welfare of the individual firefighter.

Another publication of relevance to the topic from the USFA is the 2003 report *Safe Operation of Fire Tankers* (2003). Although this document specifically speaks to tanker operations, the information contained in this report is relevant based on the reference to pertinent NFPA standards and the applicability of the content to apparatus management in general. This publication refers to both *NFPA 1002* (2003) and *NFPA 1451* (2007a) for the suggested training and safety practices, and speaks to factors common to apparatus crashes in general, not just tankers. According to the report, there are five common causes of apparatus crashes: “improper backing, reckless driving by the public, excessive speed by the driver-operator, lack of driving skill and experience, and poor apparatus design or maintenance” (USFA, 2003, p.5). The human factors are also discussed, one of which is more glaring than others – “Failure to Have [emphasis added by the author] or Follow Department SOP’s” (USFA, 2003, p.9). The report provides an effective framework to help establish these directives for the department in need of
establishing these SOP’s. The report contains content related to safe driving practices and content concerning actual driving courses as provided by VFIS.

In 2004, USFA published the *Emergency Vehicle Safety Initiative* (2004), an all-encompassing report addressing not only driver-operator training, but the overall management aspect of an apparatus management program. This particular document represents the evolution of the general fire service attitude where apparatus management is concerned. The content of this publication addresses all the facets of the applicable NFPA standards previously mentioned in this effort (NFPA, 2003; NFPA, 2007a; NFPA, 2007b) making it an exceptionally valuable tool for developing an apparatus management plan. This advocates the appropriate application of training and certification to reduce the number of annual fatalities and accidents associated with apparatus operations; the report considers several factors outside the scope of this particular effort such as vehicle design, safety during highway response, and traffic control devices – specifically optical preemption systems. One interesting idea contained in this document is the concept of establishing a training system similar to the red-card system of the wildland training arena. This effort does suggest the concept of POV response awareness, as well as addressing the need for change in attitudes and behaviors of driver-operators and candidates for those positions. The findings of this report support the content of *NFPA 1451, NFPA 1500*, and *NFPA 1002* (NFPA, 2003; NFPA, 2007a; NFPA, 2007b) considering initial training, frequency of refresher, and other human factors contributing to apparatus crashes. Factors identified include knowledge base, skills, ability, and attitude.
One reference of note from the International Fire Service Training Association (IFSTA) was evaluated for this research effort, *Pumping Apparatus Driver-operator Handbook* (1999). This handbook is an instructional aid designed to assist those apparatus driver-operator candidates working towards formal certification. This text is an excellent reference for both the instructor as well as the student, containing information regarding all aspects of apparatus training. The content of this manual references the pertinent content of *NFPA 1002* (2003), to emphasize the need for the knowledge from each particular chapter. Information regarding liability of improper or unsafe operation is discussed, and places added emphasis where individual liability is concerned. This reference is an all-encompassing manual which, although lengthy, does provide a curriculum directly in concert with applicable consensus standards from both the NFPA (NFPA, 2007a; NFPA, 2007b; NFPA, 2003) and NWCG (NWCG, 2008).

The web sites of the International Association of Fire Chiefs (IAFC) (IAFC, n.d.a) and the *On-line Resources* web site of the Volunteer and Combination Officers Section (VCOS) (VCOS, n.d.) of the IAFC provided several pertinent articles concerning Apparatus Driver-operator training and response. The VCOS site contains examples of SOP’s of several fire departments around the nation for review and reference when developing such policies, and a link to the IAFC vehicle safety site where a comprehensive set policies and procedures for apparatus management and training can be found *Model Policies for Emergency Vehicle Response* (IAFC, n.d.b). This document is in electronic format and can be downloaded and modified to fit the individual agency. Significantly, the VCOS, in a position statement titled *Apparatus Driver Training* (2004)
supports and advocates the provisions in the NFPA standards regarding licensing and certification requirements, and that this training is given early and often.

Other web sites evaluated were the NVFC (2008a), and EmergencyVehicleResponse.com (Wilbur, n.d.). The NVFC is an advocate organization for volunteer and combination fire departments, while EmergencyVehicleResponse.com is an organization which promotes safe vehicle operations and provides on-site training by M. Wilbur, a Lieutenant with Fire Department New York. Wilbur is a regular contributor to fire service periodicals on the topic of safe vehicle operations. Both web sites provided insightful information concerning training programs.

The NVFC *Emergency Vehicle Safe Operations* (2008a) web page contains numerous links to various sets of framework outlines concerning the numerous facets of a safe response policy regarding fire apparatus. The information is represented as a set of criteria and questions to assist the AHJ in determining what factors to consider when developing and adopting SOP’s concerning apparatus. The NVFC site contains links to framework SOP’s for development of the same at a local level.

The material presented on the web site for EmergencyVehicleResponse.com describes the training program offered by the author of the site, M. Wilbur (n.d.). The course contains material designed to assist each department in developing driver-operator training programs and standard operating guidelines pertinent to an apparatus training and management program. This program is presented by Wilbur and has costs associated with implementation.

Relevant material regarding apparatus driver-operator training and management policies available through private sources were evaluated. These sources were reviewed
from insurance documents as well as consulting with the trucking industry to ascertain what information may be available through those venues.

The most significant sources of information available from the insurance industry are published by VFIS. VFIS, a subsidiary of Glatfelter Insurance Group, one of the largest insurers of fire departments in the United States is a major contributor to literature regarding safe apparatus response (USFA, 2003). The information reviewed was presented as components of a training program. They are summarized in chronological order beginning with the oldest.

First issued in 1997 and revised in 2000, the *Emergency Vehicle Driver Training Program* (VFIS, 2000) is a course which addresses all facets of apparatus training and management. Particular emphasis is included concerning liability and judicial review to educate and inform the management and administration concerning these issues and their implications on both a personal as well as an organizational level. The material contains significant information about defensive driving and crash avoidance, with a defensive driving matrix similar to that of the *Smith System* (2008) which will be touched upon in conjunction with private industry practices. The coursework includes multiple written tests for each chapter, as well as blueprints for a competency driving course. This program should entail approximately six hours per the information contained in the instructor guide.

Another VFIS publication, which is primarily intended as continuing education, or recertification material is *Dynamics of Emergency Vehicle Response* (2001). This course presents more detail to augment the knowledge base of the experienced driver-operator and supplemental information regarding time and space management as well as
driving ahead for safety. Video segments are included to help promote discussion and assess the level of competence and expertise of the driver-operator. This curriculum also addresses crash avoidance and, significantly off-road driving information; length of the course as presented in the material is three and a half hours.

VFIS also published the 2003 edition of the 1997 document *Emergency Vehicle Response Safety* (2003). This course contains a wealth of material regarding apparatus management principles. This publication presents the essential components of an apparatus management safety program, and addresses myths, crash analysis, statistics and administrative controls. This source provides a blueprint for initial training in any program, and may be augmented with agency specific material for purposes of applicability. The apparatus safety information serves as good information for development of SOP’s. The material contained represents approximately four hours of instruction.

The last two VFIS items are part of the *Operation Safe Arrival* series, *Intersections* (2003), and *Emergency Vehicle Roll-Over Prevention* (2004). Both are relatively short video presentations which provide a good source of pertinent knowledge for the driver-operator trainee, as well as refresher material for annual-bi-annual training and recertification efforts.

Recent applied research projects by other executive fire officer students were also reviewed for relevant information, and applicable findings. Significantly, McKay (2007) of Lincoln Fire & Rescue in Nebraska states that “national standards are the base of a good driver program” (McKay, 2007, p. 21), referring to *NFPA 1002* (2003) and *NFPA 1451* (2007a). McKay further suggests that a committee be established to assist with
policy implementation. Although Lincoln Fire & Rescue is a career fire department, the issues concerning buy-in by membership are as applicable in a volunteer or combination department, if not more so due to time constraints as well as department culture.

Grote (2004) of Kansas City, Mo., noted that one interviewee stated that there needed to occur a “cultural re-engineering” (Grote, 2004, p. 35) to overcome the entrenched attitudes and opinions of the fire service in general, and observed that key, formal leaders are the basis of any effort. Grote recommended a comprehensive program to address apparatus driver-operator training issues. Accident investigation, consistent discipline and accountability are also essential elements of this type of program. Again, these observations are from a career organization, but are still applicable to the needs and demands of the volunteer and combination agency.

Deerfield Township Fire and Rescue, of Ohio, also struggled with SOP’s regarding Apparatus Management (Cardwell, 2004). In his research effort, Cardwell analyzed the National Institute for Occupational Safety and Health (NIOSH) fatality reports concerning returning-responding fatalities, and fatalities on scene at highway incidents. He observed that the human element is most commonly to blame for fatal incidents. Cardwell’s findings concur with those of McKay (2007) suggesting that applicable NFPA Standards be the foundation to all training and education programs, further recommending that education is paramount to a safe driving attitude. The driver will be more apt to follow procedures if they understand why they are in place. Cardwell’s observation that “you must have a thorough understanding to manage the risk” (Cardwell, 2004, p. 51) accents his conclusion that an apparatus management
program needs to be comprehensive in scope as well as implemented and enforced to be an effective component of the change process.

Concurring with the other executive fire officer students, Ivan (2007) advocates both alignment with national standards, as well as consistent discipline and review for a continuing improvement process, but also suggests an annual review of the apparatus management program and related SOP’s of the department to ensure that they stay both current and applicable with the needs of the organization.

Procedures

This part of the research effort will focus on the manner by which the information for the study was obtained and the data acquired from the various sources.

A literature review was conducted to ascertain information regarding the research questions. The literature review was carried out by referencing information in the form of legal requirements, and pertinent standards. Associated research and documentation available from various fire service affiliated organizations and government entities was also considered. Material from private sources was scrutinized to assess pertinent content from insurance programs, and the trucking and oil and gas industries due to the similarity of equipment type and characteristics.

The first research question asking what the elements of an effective apparatus management program were was addressed by consulting the WDFPES to determine if any legal obligations regarding licensing requirements for the various types of apparatus existed. This would be pertinent to the implementation timetable of any apparatus management program. Wyoming does not mandate any fire service specific training or
certification for any fire department concerning suppression related operations (personal communication May 12, 2008).

The next avenue of information was the consultation of applicable consensus standards as promulgated by the NFPA. The NFPA standards present three documents which specifically address apparatus management, NFPA 1451 (2007a), *NFPA 1500* (2007b), and *NPFA 1002* (2003). All three standards provided material relevant to the requirements of an apparatus management program, the first document reviewed was NFPA 1451, which in turn referenced NFPA 1002, and *NFPA 1500*.

The fact that Fire District #1 also experiences a significant number of wildland fire calls suggested a search of standards pertinent to that type of operation as well. These sources were located through NWCG materials as distributed by the local BLM Field Office (NWCG, 2008) and normal NWCG coursework (NWCG, 2002). Although the information is relatively limited through this avenue, it is still pertinent as local mutual aid agreements obligate the AHJ to certain SOP’s.

The other fire service associated organizations consulted are variously regarded as either trade organizations or federal government departments. The USFA was at the top of this list, having the specific dedication to the safety and survival of firefighters as well as the reduction of losses to fire in the United States. Four documents relative to the research effort were found, and although somewhat dated in one case, still provided valuable insight into the elements of an apparatus management program (USFA, 1996a; USFA, 1996b; USFA, 2003; USFA, 2004).

Trade organizations provided several resources from their web site homepages. Most notably the NVFC site (NVFC, 2008a) has several links to generic content,
allowing the agency effort towards apparatus management to be developed according to locale specific conditions and requirements. This site also provides a link to a self survey designed to compare current agency SOP’s to stated best practices.

The IAFC provided links to model policies (IAFC, n.d.b) and also to existing SOP’s and policies of select emergency organizations (IAFC, 2008a) for comparison and allowing current industry practices to be incorporated into the new SOP’s being developed by the individual agency. The VCOS (2004) web site provided support for the implementation and development of responsible training and certification.

Insurance programs were then assessed to determine what facets of a training program are important based on the experience gained through previous losses. The single largest source of information was provided by VFIS (VFIS, 2001; VFIS, 2000; VFIS, 2004; VFIS, 2003a; VFIS, 2003b). This organization provides multiple resources for training and apparatus management free of charge to all emergency agencies in need of curricula and management SOP’s. The information is relevant to the content of an apparatus management program in that all facets of a program are addressed including driver selection, safe operation policies, human factors, case studies, as well as the normal SOP’s required for training, evaluation, re-training, maintenance, apparatus design, etc. Coupled with the information from the applicable NFPA standards, these are the most effective group for content specific to an apparatus management program where the design and training components are considered.

The efforts of recent executive fire officer applied research projects were also considered to find out what other fire and emergency organizations had incorporated into their apparatus management efforts as far as SOP’s, and management practices. Four
executive fire officer applied research projects were found to have relevance to this effort (Cardwell, 2004; Grote, 2004; Ivan, 2007; McKay, 2007). Although the organizations were of different size and response scope from Fire District #1, there were facets of their findings which were applicable to the needs of this research.

The second research question enquired concerning the relevant standards and practices existing in private industry regarding driver training and evaluation. The concordant safety and training practices found in the trucking and oil and gas industries would provide insight in determining what types of SOP’s and training programs are employed by corporations depending on safe driving skills for their livelihood.

The trucking industry was consulted to determine what the current training and management efforts were and how they may apply to the fire service. This information is particularly noteworthy as the equipment has many of the same handling characteristics of fire apparatus, and these organizations also conduct business on public thoroughfares, much the same as responding apparatus, if not under the exact circumstances. The limitation of these references is the primary mission of their operation. The safety aspect of the operations of private industry applies to emergency services, but the additional dynamic of emergency response does not exist in these organizations.

Several companies and organizations were identified, including UPS, Yellow Freight, The American Trucker’s Association, and Halliburton Services, a company with a significant road presence in southwest Wyoming. Of these four sources, only UPS (Appendix A) and Halliburton Services responded. Halliburton referred the research effort to the private contractor which currently conducts Halliburton’s driver training education efforts. The contractor was unavailable for discussion.
Another private driver training company, Center for Transportation Safety \((\text{Appendix B})\), used by EnCana Services, a local oil and gas services company was referred to the author after attending a light truck training course. Personnel from both organizations, both UPS \((\text{Appendix A})\) and Center for Transportation Safety \((\text{Appendix B})\) were interviewed. UPS referred the research efforts to the foundation of their training philosophy, that of defensive driving \((\text{Smith System, 2008})\). Center for Transportation Safety provided basic information about the curricula regarding class-b driver training which is offered at regional training centers and local delivery as requested.

The third research question asked what training programs are now in existence in private industry, insurance documents, and fire service programs and organizations which may provide elements for an apparatus management program at Fire District #1. Accordingly, information from various private organizations, as well as fire service literature was reviewed for relevant content.

The information gained through interviews and referred curricula from UPS \((\text{Appendix A})\) and Center for Transportation Safety \((\text{Appendix B})\) was used to evaluate what types of initial training are required as normal business practices to which safe driving is part and parcel to their everyday operations. The information from UPS was analyzed for pertinence to initial training and approval of selected candidates, while the Center for Transportation Safety curricula was compared to the requirements of \textit{NPFA 1451} \((2007a)\). Other material from VFIS \((\text{VFIS, 2001; VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004})\) as well as \textit{IFSTA} \((1999)\) was incorporated into the effort as this information is developed specifically with the fire service in mind.
A questionnaire was developed consisting of ten questions regarding apparatus training and management policies. The content of the questionnaire as well as the results can be found in Appendix C and Appendix D respectively. The questionnaire was sent to representatives of 84 fire and emergency organizations throughout Wyoming, Utah, Colorado, Idaho, Montana, and Oregon. The questionnaire recipients were identified by consulting the state fire directories of each state in an attempt to identify departments of a size and composition to that of Fire District #1. The questionnaire was sent out via email. The limitation of the information obtained through the questionnaire was the validity and age of the information in the agency profile.

Accordingly the first question asked if the organization were volunteer, career, or combination type organization. The management dynamic as well as the training and personnel availability are different between the various types of organizations. Volunteer personnel must continually juggle their time in accordance with the needs of primary employment, family and fire department activities.

The second question addressed the size of the organization. The size of the organization helps reference the availability of training to all department personnel. This is relevant to the number of available personnel needed to maintain adequate response capability during training sessions.

The third question was added to identify an average department profile according to apparatus fleet composition. In the small-town, rural environment of Wyoming, some types of apparatus are not as common, for example aerial apparatus. Question three also indicates how much extra time will be needed to familiarize apparatus driver-operators
with all types of apparatus they will be expected to drive and operate based on the complexity of the apparatus fleet.

The fourth question asked if the individual knew whether or not the state in which they operated required apparatus driver-operators to possess a valid license for the type of vehicle being operated, with don’t know being one option. This option allowed the author to determine how current the organization would be with the legal aspect of apparatus management.

The fifth question concerned whether or not the individual department trained or certified apparatus driver-operators to determine how prevalent training was for agencies of a like size and composition to Fire District #1. This question allowed the author to determine how prevalent driver-operator training and management are in organizations of a similar size and composition to Fire District #1.

The sixth question enquired about the types of training provided. The intent was to define the current standard of training for comparison to pertinent industry best practices. The answers would also help identify the time component required for initial training.

The seventh question built upon the information gained through questions one through six, determining what curricula the department adopted or developed to accomplish their training efforts. A variety of options were provided to allow the best definition of content. All available training programs known by the author were included.

The eighth question was included to establish an average amount of training and instruction provided to each driver-operator candidate. The original intent of question eight was to determine the actual time spent in a classroom setting, as opposed to the total
time spent for apparatus driver-operator training per individual. However, due to improper wording of the question, it seems likely that the responses represent total time spent training each candidate.

The ninth question defined the actual hands-on supervised types of training each driver-operator candidate experienced. This question also defines what facets of an apparatus management program each organization considers applicable. The criteria for question nine were drawn from NFPA standards (NFPA, 2003; NFPA, 2007a; NFPA, 2007b).

The tenth question was included as an attempt to assess how important the entity thought their driver-operator program was to their membership. Professionalism, as well as the prestige of being the person who drives the fire truck could be a valuable part of any efforts towards recruitment and retention of personnel.

The fourth research question defined the continuing education requirements after initial training. This was addressed through the interviews with the private entities as well as information acquired through NFPA standards (NFPA, 2003; NFPA, 2007a), and VFIS programs (VFIS, 2001; VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004). The NFPA standards contain explicit data concerning post-certification training as well as ongoing training requirements (NFPA, 2003; NFPA, 2007b).

Results

The Literature Review having been conducted, and the Procedures defined, the Results of the research effort are as summarized below according to the respective research questions with regard to the original research problem statement: Fire District #1 has no plan or philosophy for managing apparatus safety, response policies, or minimum
set of skills required to drive apparatus to and from the scene, and operate the same piece of equipment on scene.

Research Question #1. What are the elements of an effective apparatus management program? The review of the Wyoming State Statutes provided no insights concerning any type of required training, or licensing beyond the mandatory use of seatbelts required of all occupants of moving motorized vehicles.

The NFPA Standards provided the most comprehensive definition of the core requirements of an effective apparatus management program, first by specifying the existence of the program in NPFA 1500 (2007b), then by defining both the elements of a training program as well as the requirements for qualified driver-operators in NFPA 1451 (2007a) and NFPA 1002 (2003) respectively. These recommendations were further supported by the various VFIS driver-operator education and training programs from the fire service side of the literature to encompass not only driving skills and fire-ground operations, but also the legal aspects and personal impact associated with the responsibilities of the driver-operator (VFIS, 2001; VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004).

The references from private industry from UPS (Appendix A) and Center for Transportation Safety (Appendix B) verified the need for initial driver training and evaluation. The practices employed and suggested by these entities specify evaluation with consequences for poor performance upon initial evaluation and periodic evaluation after avoidable accidents as well as at regular intervals. Disciplinary procedures also figure prominently in the UPS fleet safety program.
Based on content from the NFPA standards (NFPA, 2003; NFPA, 2007a; NFPA, 2007b) information from VFIS (VFIS, 2001; VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004), and private sources (Appendix A; Appendix B), a basic set of core requirements for apparatus management and driver-operator training was identified. The content is consistent with industry best practices, and provides a comprehensive method by which responses can be safely managed and effective training programs developed and implemented. The essential elements of a model program can be found in Appendix F.

Research Question #2. What relevant standards exist in private industry regarding driver training and evaluation? Programs existing in private industry regarding driving and operation of trucks and equipment with handling characteristics were evaluated. UPS and Center for Transportation Safety were the two entities providing information and are discussed separately due to the difference in philosophy and primary business purpose.

UPS (Appendix A) engages in the delivery of freight to different locations, making the focus of their program safe, accident free operation. Accordingly, the program utilized by UPS depends heavily on defensive driving and safe driving practices. The program involves an initial 40-hour training and orientation course designed to acquaint the new driver with hazard recognition and defensive driving practices. Graduation from the course and ensuing employment is contingent on the successful completion of a final day of evaluation of driving with a 30 minute defensive driving exercise designed to evaluate how effectively the student identifies and searches for hazards encountered in a normal workday. The program requires annual ride-along sessions by supervision to evaluate and verify the retention of the principles and practices taught in the initial
training and orientation session. Drivers are also re-evaluated after any avoidable accident as part of the disciplinary SOP’s. The other facet of the UPS program which could be incorporated is the health and safety awareness aspect by having an ongoing safety theme, or message specific to the time of year, or recent events, such as safety stand-downs, seasonal considerations, etc.

Center for Transportation Safety is a for-profit company specializing in driver training for all types of vehicles (Appendix B). Correspondingly their training program is fairly aggressive. The intent is to provide a program which trains and educates drivers to drive within the laws and ordinances of a particular jurisdiction, while also teaching appropriate defensive driving techniques, vehicle handling characteristics, systems operation, inspections, legal considerations, wellness and the driving environment. This curriculum truly provides a learning experience which intends to address all facets of vehicle operation according to the particular vehicle type. The course is presented in a 4.5 day format at ten hours per day, and four hours of testing on the final day. The course includes four hours of instruction concerning vehicle inspections, as well as eight hours of driving instruction. The course is a tested course with a minimum passing grade of 80% for successful course completion.

Research Question #3. What training programs are now in existence in private industry, insurance documents, and fire service programs and organizations which may provide elements for an apparatus management program at Fire District #1? The different Driver-operator Training programs were evaluated from various sources ranging from the guidelines contained in *NFPA 1451* (2007a), to the publications of the USFA (USFA, 1996a; USFA, 1996b; USFA, 2003; USFA, 2004), to the VFIS programs (VFIS, 2001;
VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004). Additionally a questionnaire was developed and sent out to 84 fire departments to determine which programs and types of programs are currently in use in emergency organizations with response demographics similar to those of Fire District #1 as well as instructional time required and composition of those training programs.

The programs offered through VFIS (VFIS, 2001; VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004) provide the necessary information and hands-on instruction to train driver-operator candidates for driving duties. The limitation of this material, however is that they do not contain any instruction pertaining to apparatus operations on scene as the major focus of the material is loss control and accident prevention. The material does provide content for periodic training and continuing education, and has a very solid base for instruction and initial evaluation of skills and abilities. The driver skills exercises would provide the basis for periodic hands-on driver reevaluation sessions.

When considering the development of a formal curriculum for driver-operator training, two sources of information provide relevant content. The information found in S-216 (NWCG, 2002) provides the necessary education to familiarize the driver-operator candidate with the off-road environment, while the IFSTA manual (1999) provides information in concert with the recommendations of NFPA 1002 (2003). Additional information concerning defensive driving and related exercises as indicated in the UPS model (Appendix A) provide a means to implant the proper mental state needed to create safety conscious apparatus driver-operators with a pro-active attitude concerning safe response and operations.
The questionnaire was returned by 27 recipients, all of which were anonymous as per the design of the questionnaire. The results to the ten questions are summarized in the following paragraphs.

The departments which responded were predominantly volunteer organizations at 48.1%, with combination departments representing the second largest segment at 44.4%; the organizations were predominantly of the same size as Fire District #1 at 42.3%, that size being representative of a department with a membership number between 25 and 50 active members; 75% of the individual respondents belonged to an organization with between 15 and 100 personnel.

The type of apparatus operated most commonly was pumper, followed by wildland, tender, and command-support, and light rescue, with slightly more than half of the respondents’ agencies operating aerial apparatus, and roughly one-fourth of the organizations employing heavy rescue apparatus. Together with the questions concerning department demographics, these results reflect the commonality of the apparatus compliment of Fire District #1 to organizations polled being of a similar size and composition to Fire District #1.

The next two questions sought to discover what types of training and certification were required by the laws of the individual state, as well as the department-specific requirements. The questionnaire asked if apparatus driver-operators were required to posses a CDL in their respective state, with don’t know being an answer added in as a means to discover how knowledgeable the individual was concerning legal requirements; 74.1% had no state requirement for a CDL, with 22.2% operating in states with a CDL requirement. Only one respondent was unaware of the licensing requirements of their
state. The majority of the departments trained or certified members as driver-operators, with only two of the 27 returning a negative response. These results demonstrate that, in large part most agencies recognize the need for apparatus driver-operator training and are largely aware of the legal requirements particular to the individual state.

The next four questions addressed the type of instruction provided, requesting which types of instruction were provided, together with the amount of time spent on the training, type of hands-on training administered, and what instructional curriculum was employed. In direct conflict with previous responses, all agencies provided some type of training, mostly hands-on consisting of driving exercises and practical hands-on, with only 21 of 27 departments providing any classroom instruction and 18 requiring a driver skill test to verify the abilities of the candidate. The most common curriculum was that of IFSTA (1999) at 64%, with internally developed programs and Department of Transportation (DOT) curricula returning 44% and 40% respectively. The free training programs offered by VFIS were used by 32% of agencies. Four organizations used the National Safety Council program, and two agencies employed a private contractor for apparatus driver-operator training. The time spent training driver-operators was widely variable, with most agencies providing more than ten hours. Conversely eight departments administered only four hours of class time, with the end result of 60% of the respondents providing at least eight hours of training, and 40% providing six hours or less of instruction.

In the category of types of hands-on training provided no one respondent required all of the types of training listed. Most provided supervised driving and backing
exercises, but only 22 agencies addressed pre-trip inspections, with 18 providing
defensive driving/accident avoidance, and 14 specifying repair and damage reporting.

The final question enquired as to whether or not the respondent considered the
driver-operator training program of their respective agency an asset for recruitment and
retention of personnel. This question attempted to discern if any organization considered
the benefits of providing a skill and ability which may translate to the primary
employment of the candidate through applicable training and career development. The
thoughts of the author were that this type of training program could possibly allow
parallel training for a skill which would enhance the job skills and marketability of the
firefighter in the private sector, fostering a sense of loyalty in those already trained, and
attracting new recruits seeking better opportunities. Of the respondents, only 37%
considered their program to be an asset for recruitment/retention, with 44.4% having no
opinion and only 18.5% returning a negative response.

Research Question #4. After initial selection and training, what continuing
education requirements, or annual training, if any are pertinent?

The information provided by NFPA 1451 (2007a) provides an explicit
quantifiable definition of periodic training requirements, stating that training will be
offered as often as needed to maintain proficiency, “…but not less than twice each year”
(NFPA, 2007a, p.13). Further evidence of the intent is the requirement that the training
involve actual driving and hands-on practice, training, and evaluation. Information
obtained through the NWCG (2008) as well as the USFA (2004) both recommend that
individuals undergo annual refresher training and recertify according to department
standards.
References from private industry indicate that ongoing education and safety programs are an essential part of a safe and efficient fleet operation, as noted in the interview with J. Eaker of UPS (Appendix A). These considerations include both a scheduled, periodic evaluation, as well as intervention-type evaluation after avoidable accidents.

Discussion

This section will discuss the findings of the research effort in the context of the results as they relate to the intention of defining a comprehensive apparatus management program. The implications of having such a program in place as opposed to the current situation will also be addressed.

The common adage is that the Fire Service is 300 years of tradition unimpeded by progress. Although humorous at times, this clearly indicates that our collective heads are in the sand where change and positive progress are considered. The opinion of the author is that the career segment of the fire service has been the most progressive arena for change, largely due to the fact that time is available as a normal part of the occupational experience, allowing as much time and effort as department standards require between incidents for training and education. The volunteer fire service however, with the limitations imposed by the need to continually balance time between the demands of a primary employer, home and family, and the increasingly complex training and response requirements of the fire service, has not been as proactive in raising the bar to a higher standard where development and implementation of life safety, occupational safety and health, and procedural SOP’s are concerned. Times are changing, and the same traditions which are so ingrained in the identity of the fire service are being rousted out and made
obsolete by voluntary consensus standards which delineate a standard of care such as those promulgated by the NFPA (NFPA, 2003; NFPA, 2007a; NFPA, 2007b), and the presence of laws such as the Occupational Safety and Health Act that require compliance.

The fire service of today must address occupational safety and health concerns within the scope of accepted best practices (NVFC, 2008b) as well as the safety and health of both those to whom emergency response is paramount at any given moment, and those incidentally present during those same responses such as bystanders or the general public present in the vicinity or along the response route. Volunteer fire departments are just as liable for acts of negligence as are their career counterparts. Everyone in today’s fire service is held to the same standards and expectations.

Each year, the second most common cause of firefighter fatalities is associated with accidents occurring while riding in or driving emergency vehicles (NFPA, 2008a). The causes of these incidents are the result of many factors. However, the one overriding facet which can be reasonably addressed is the input from official sources in the form of SOP’s and effective leadership (Goldfeder, 2008). Although SOP’s are the foundation of any management effort, it is the person in charge who makes the program function as it should, through effective development, enforcement, and periodic re-evaluation of SOP’s. The insightful leader will solicit input from subordinate officers and informal leaders among the troops to involve the entire organization and create buy-in and ownership of the SOP’s.

Cardwell (2004) noted that of 42 fatality investigations conducted by NIOSH that lack of SOP’s governing apparatus response were listed as a contributing factor in more than 50% of fatal incidents. These figures include recommendations for mandatory seat
belt use while riding in or driving apparatus, another form of SOP, and part of an apparatus management program. Another fact which Cardwell points out is that apparatus driver-operator training issues were noted in conjunction with all 38 hazards associated with the fatality investigations mentioned above. This validates the fact that human factors are a major part of the problem, further indicating the need for an effective apparatus management program.

The findings of other executive fire officer student efforts also indicate that the time for flying by the seat of one’s departmental pants is past due. Grote (2004) points out that a comprehensive apparatus management program is necessary to begin what one interviewee noted as a “cultural re-engineering” (Grote, 2004, p. 35), meaning that it is time to get on board with national standards. Ivan (2007) observed that adopting or following an accepted standard for apparatus management, including training and response SOP’s is a “prudent” (Ivan, 2007, p.47) practice. McKay (2007) also contends that adopting pertinent standards concerning apparatus driver-operator training, such as those in *NFPA 1451* (2007a) must replace the current laid back attitude prevalent in the fire service. Although this author previously opined that this is most common in the volunteer fire service, it is obvious that this lack of accepted best practices concerning apparatus management spans the fire service as a whole.

Although losses associated with emergency apparatus could not be defined through insurance sources due to confidentiality and an unwillingness to make those figures public, the litigious nature of modern society would certainly indicate that liability is a significant factor when considering the development and implementation of an apparatus management program. As discussed above, the days are gone when
emergency organizations seemed exempt from the establishment and implementation of
SOP’s which meet accepted industry standards, it is now expected that a responsible
organization will perform to said standards, and that no organization is above
accountability for their actions, both good and bad (Tutterow, 2008).

The literature review revealed a wealth of information already in existence that
will provide an excellent foundation for development of a comprehensive apparatus
management program, or in the case of the IAFC Model Policies for Emergency Vehicle
Response (IAFC, n.d.b), a ready made set of guidelines and SOP’s virtually at a
keystroke. Training programs, proven training programs, are available free through VFIS
(VFIS, 2001; VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004), and if agency funds
permit and a more structured, formal program is desired, training is available through
private organizations which meets or exceeds fire service standards.

The questionnaire showed that the majority of emergency organizations conduct
apparatus driver-operator training, although the time involved as well as the curriculum
varies according to the individual department. The majority of departments require six or
more hours of classroom education and hands-on training before an individual is allowed
to drive and operate apparatus. The questionnaire didn’t consider mentorship or initial
driver probation. This was indicated as an essential basic component of an apparatus
program, both in NFPA standards (NFPA, 2003; NFPA, 2007a) as well as in private
industry. UPS requires an annual ride-along to verify the safety and skills of the
individual, as well as the same after any avoidable accident (Appendix A). Common sense
would dictate that accident investigation also is included in the mix, at the very least to
discern which accidents were avoidable, and what factors contributed to all types of accidents to round out a pro-active apparatus management program.

A facet of the questionnaire which has not been given much attention, but could prove valuable is the use of a program and SOP’s in conjunction with the recommendation that driver-operator candidates obtain a class-b driver’s license. If the individual were afforded the opportunity to test for a CDL, or applicable Wyoming class-b driver’s license using Fire District #1 apparatus, recruitment and retention efforts could receive a strong boost, providing yet another benefit to participation in the volunteer fire service.

The casual attitude that has existed thus far in Fire District #1 must not continue; obviously the fire service as a whole is beginning to take notice of the need for modern, pro-active SOP’s and policies for all facets of operations. The responsible obligation is that of developing and establishing, in the context of this research effort, a comprehensive apparatus management program with well-defined, easy to comprehend SOP’s for all facets of the problem, from training and education to response, maintenance, purchasing requirements, etc. It is the responsibility of the management, officers and directors of Fire District #1 to support such a program, from a safety viewpoint primarily, but also considering the legal aspect and the preservation of response capabilities of the organization. Development and implementation of such a program will require the input and cooperation of all the staff and officers of Fire District #1. As no worth-while decision should be made in a vacuum, the buy-in from the officer contingent will be paramount for acceptance by the personnel, and therefore these same
individuals’ input will need to be solicited and incorporated to assure adoption of a program palatable to all concerned.

The development and adoption of a comprehensive apparatus management program will help protect the staff, membership and board of directors of Fire District #1 from unnecessary exposure to liability due to negligence and other than accepted best practices. Additionally the safety of Fire District #1 personnel as well as that of the general public will be enhanced through a pro-active approach to safe, responsible response SOP’s. Continuing in the same vein, the program will promote professionalism within the organization, furthering the recruitment and retention efforts of Fire District #1 and enabling a well-trained, safety conscious fire service organization which will provide efficient and safe response to incidents for the foreseeable future.

Recommendations

This section presents the recommendations which logically flow from the results of the research effort. These recommendations apply to Fire District #1. However, the implications of the ideas presented also apply to outside organizations who may find themselves in a position of non-existent or inadequate policies and procedures concerning apparatus management.

The findings of this effort support the trend towards the development and implementation of responsible SOP’s which conform to recognized national standards and practices. Statistics concerning annual LODD’s and injuries associated with apparatus accidents support the need for the efficient, effective development of policies and procedures defining response, training, maintenance, and other apparatus management concerns (NFPA, 2008a; NFPA, 2008B).
The recommendation of this author is that Fire District #1 develop a comprehensive apparatus management program based on the need defined in this effort. The program must incorporate the requirements of *NFPA 1500* (2007b). The program must also consider the qualifications for apparatus driver-operators outlined in *NFPA 1002* (2003) as well as the training requirements outlined in *NFPA 1451* (2007a) when developing and implementing the program and relevant SOP’s.

It is paramount that the entire officer contingent of the organization is involved in these proceedings in order to attain buy-in from the rank and file. Inclusion of the informal leaders in the organization will also help to assure success with this endeavor. To the same end the board of directors of Fire District #1 also needs to be kept abreast of progress and status of the effort as they also have a very real stake in the outcome. The training program could be administered parallel to the current training curricula, much the same as firefighter one training is conducted presently. This would minimize the amount of extra time required for those individuals identified as candidates for assignment to apparatus driver-operator duties.

The program will require an aggressive training element to comply with accepted standards and practices as outlined in the research. The importance of classroom education including SOP’s as adopted in conjunction with the program, defensive driving, inspections, accident reporting/investigation, and pump operations cannot be overstated. As represented by the success of the UPS program (2005) the importance of knowledge should not be excluded at the expense of ability.

The hands-on portion will require driving instruction, along with defensive driving drills, and an evaluation of ability. The candidate should be required to complete
training on all apparatus which they will be expected to drive-operate. Obviously pumping operations and related scene tasks will also be included in the curricula as pumping operations are central to the function of fire apparatus. Inspections being the principal means by which defects are detected, this element will also demand inclusion in both the classroom and practical training environments.

The development and implementation of this training, education and management effort need not be costly. There is abundant information available at little or no charge through VFIS (VFIS, 2001; VFIS, 2000; VFIS, 2003a; VFIS, 2003b; VFIS, 2004), the NVFC (NVFC, 2008a), IAFC (IAFC, n.d.b), and the VCOS (VCOS, n.d.). The education portion would require some printed material for pump operation theory and practice through literature from the IFSTA (1999), however the number of candidates in the program will in all likelihood be fairly low, allowing the use of materials already on hand in the Fire District #1 library.

The relevance and importance of NFPA 1500 (2007b) should also be considered in the development and implementation of these SOP’s. As evidenced by the success of the UPS (2005) efforts, periodic reminders in the form of safety slogans, safe performance awards and events should be included in the health and safety program to serve as reminders of the hazards and conditions pertinent to the safe performance of driver-operator duties. Much the same as tactical fire service programs begin with an awareness level of training, all safety and health efforts mandate frequent reminders to continually maintain awareness of safe practices and procedures and the performance of the same. The inclusion of this thought process will facilitate future efforts towards the
“cultural re-engineering” (Grote, 2004, p. 35) of the attitudes and opinions ingrained in the organization.

One side benefit of the development and implementation of these efforts may be through the promotion of acquisition of the appropriate class-b driver’s license, providing a means for membership to enhance their personal development, while simultaneously demonstrating to the general public one of the many advantages of the volunteer fire service. In turn, this would provide a higher level of professionalism while presenting a more professional image to the general public.

The findings of this effort should serve as a reminder to Fire District #1, as well as any other individual seeking the betterment of any organization both now and in the future of the imperative to ignore status quo. Pertinent, progressive change can only be realized by stepping outside the box to get a third person perspective, employing adaptive leadership to seek out constant improvement through the active acquisition of pertinent knowledge and implementation of accepted best practices in order to promote continual improvement of both services and abilities of the organization (USFA, 2006a).
References


Appendix A

Personal Interview with J. Eaker, UPS Fleet Safety Manager

April 18, 2008

Subject: Interview with J. Eaker, UPS Fleet Safety Mgr. by J. Wamsley (author)

(404) 828-6338

The interview was conducted via phone from Fire District #1 Fire Station at 11:30 am on April 18, 2008.

J. Eaker is the UPS Fleet Safety Manager, responsible for Safety of all Operations.

Introduction – Chief J. Wamsley of a fire protection district in Wyoming comprising @2000 sq. miles; currently conducting research regarding apparatus driver training for volunteer firefighters. I would like to enquire about driver training standards and related information as conducted by UPS. The information will be pertinent to a related category of Fire Apparatus; specifically corresponding with class-b driving practices.

Wamsley: Obviously a CDL is required for all drivers within the system.

Eaker: Not necessarily, UPS follows licensing requirements according to the state in which the driver will be operating; normally for vehicles in excess of 10,000# GVW. Some states have different licensing requirements, and the personnel are licensed accordingly; but not with a CDL, which is a national license; just according to the requirements and to the state licensing level.

Wamsley: What comprises the driver training program for UPS? How much driving time, class room instruction, etc.?

Eaker: The driver training program consists of a one week orientation, of which approximately 75% is about safety. The driving portion is on the last day and consists of
an all day ride along with a 30 minute period during which a hazards recognition drill is conducted. The drill lasts for two minutes at a time, with three to five minute intervals between the two minute hazards recognition exercises; the driver candidate is expected to check all sides of the vehicle – front, rear, right & left sides for at two seconds each, explaining any hazards in the immediate vicinity as well as any hazards along the route.

Wamsley: The training must also include information on the handling characteristics of the particular vehicle the candidate will operate.

Eaker: Yes; also the “five keys” from the Smith System (www.smith-system.com) are emphasized throughout the orientation. (“AGKLM” explained below). AGKLM is remembered by “All Good Kids Like Milk” (** see note)

A – “Aim High in Steering”® Drive ahead of yourself, pay attention to the dangers coming up while there is still time to avoid them and plan your actions accordingly.

G – “Get the Big Picture”® Look at the whole picture – fence line to fence line on the highway; sidewalk to sidewalk in a neighborhood; house to house; etc. Keep scanning the entire field of view to identify any hazards.

K – “Keep Your Eyes Moving”® Keep looking around at all times, check and re-check blind spots, etc.

L – “Leave Yourself a Space”® Leave enough space for defensive maneuvers and accident avoidance; don’t follow too closely; allow room for action before it’s needed.

M – “Make Sure They See You”® Make eye contact at intersections and when interacting with traffic; use signal lights, horns, etc. to communicate with other drivers to get their attention (Smith System, 2008).
Wamsley: So the majority of the UPS Driver Training program is focused more on hazard recognition, accident avoidance and defensive driving techniques than driving exercises.

Eaker: That’s correct. People learn their driving skills in High School, but not defensive driving and hazard recognition. That is what the UPS driver training program is built around, defensive driving skills and hazard recognition.

Wamsley: What type of annual evaluation or follow-up training is conducted?

Eaker: There is an annual ride along which reaffirms the defensive driving skills and hazard recognition; also after any avoidable accident occurs throughout the year. The corporation also issues a quarterly safety calendar which carries a theme specific to the time of year, i.e. watch out for school children (fall), summer playtime, use caution on slick and icy roads, etc. Each region also has additional safety programs pertinent to their area of operation – slick roads would be a concern in Wyoming for example.

Wamsley: Back to the Smith System, how does that work?

Eaker: The Smith System has been inexistence since 1952, being incorporated into the driver orientation by UPS in 1961, and adopted as a permanent component in 1971.

Wamsley: Does UPS employ any other program, such as those offered by the National Safety Council in their training agenda?

Eaker: Most, if not all of the other programs are based around the Smith System; this makes them redundant to the UPS program so the answer is no.

*This dialogue represents the transcription of the interview based on notes taken by the author.

** All facets of the Smith System are registered and owned by Smith System
Appendix B

Personal Interview with S. Scott, Center for Transportation Safety

April 22, 2008

Interview with S. Scott – Center for Transportation Safety, by J. Wamsley (author).

(303) 237-0131 ext. 204

The interview was conducted via phone from Fire District #1 Fire Station at 9:30 am on April 22, 2008.

S. Scott is a trainer for the Center for Transportation Safety, a private corporation which provides driver training for all license designations except motorcycles. S. Scott has a formal education in safety from Eastern Montana University, and 23 years experience in safety and health with Texaco.

Wamsley: I am conducting research concerning apparatus driver training for volunteer firefighters, and am examining the various curricula available in the private sector, either in-house or third-party training opportunities, employed by various private entities to train and educate their new drivers. The class-b category would best approximate the skill set needed to drive most fire apparatus.

Scott: The typical student for the class-b curriculum has no manual transmission experience, so the training begins at the novice class-b CDL level. I don’t know what the configuration of most fire trucks is. Do they normally come with a standard transmission?

Wamsley: Most fire apparatus these days are delivered with an automatic transmission; it is easier for durability issues as well as operational characteristics.

Scott: The basic training needs would be more in line with driver training where there is some experience; a classroom session, and a skills course. The classroom coursework
Practical Apparatus Management and Driver consists of the following topics: Responsibilities of the driver; and Defensive Driving Information; Personal Requirements: Wellness, understanding fatigue, etc.

The skills course consists of: Backing exercises; Tight quarters exercises, i.e. alley dock exercise, etc; Emergency maneuvers – diminishing clearance exercise, hazard avoidance, etc; and Hazard recognition. These two areas of study should develop the skills and confidence to allow the new driver to become comfortable with the equipment and the driving environment. The current course involves approximately 4-5 days of training.

Wamsley: How do most in-house programs compare?

Scott: Most in-house programs lack both focus and scope in their design and application, meaning that they need more experienced trainers with a good, solid working understanding of the requirements and knowledge needed by each driver candidate to be a safe and responsible member of the driving community. It requires special people with knowledge of the job and the desired outcomes of the training program. Our instructors are all retired Colorado Highway Patrol troopers with many years of experience in highway safety. If you would like I will have the person in charge of the class-b program forward a copy of the curriculum.

Wamsley: That would be great; also if you would like, I can share the results of my research with you.

**This represents the transcription of the interview based on notes taken by the author during the interview.**
Appendix C

Apparatus Driver Training Policies Questionnaire Questions

1. What type of fire department do you represent?
   a. Volunteer
   b. Combination
   c. Career

2. How many firefighters are in this department?
   a. Less than 15
   b. 15-25
   c. 25-50
   d. 50-100
   e. 100-150
   f. 150+

3. What type of apparatus does your department operate (select all that apply)?
   a. Pumper
   b. Aerial
   c. Tender
   d. Wildland
   e. Heavy Rescue
   f. Light Rescue
   g. Command/Support
4. Are you required by law or statute to possess a CDL to operate fire apparatus in your state?
   a. Yes
   b. No
   c. Don’t know

5. Does your department train and/or certify apparatus drivers?
   a. Yes
   b. No

6. Please indicate the type of instruction provided for apparatus driver candidates by your department (select all that apply)?
   a. Classroom
   b. Driving exercises
   c. Practical Hands-on
   d. Driver Skill Test

7. What training curriculum does your department use (select all that apply)?
   a. VFIS
   b. IFSTA
   c. Department of Transportation (DOT)
   d. Private Company
   e. National Safety Council
   f. Internally Developed (combination)
8. How much class time is spent in apparatus driver training?
   a. 4 hrs
   b. 6 hrs
   c. 8 hrs
   d. 10+ hrs

9. Please indicate which types of hands-on training are required (select all that apply).
   a. Pre-Trip Inspection/Walk-Around (supervised)
   b. Backing Skills (supervised)
   c. Spotter Training (supervised)
   d. Driving (supervised)
   e. Defensive Driving/Accident Avoidance
   f. Repair/Damage Reporting

10. Do you feel that the Apparatus Driver-operator Training program in your department enhances recruitment/retention efforts?
    a. Yes
    b. No
    c. No opinion
Appendix D

Results for Apparatus Driver Training Questionnaire

1. What type of fire department do you represent?
   a. Volunteer = 48.1% (13)
   b. Combination = 44.4% (12)
   c. Career = 7.4% (2)

2. How many firefighters are in this department?
   a. Less than 15 = 11.5% (3)
   b. 15-25 = 15.4% (4)
   c. 25-50 = 42.3% (11)
   d. 50-100 = 19.2% (5)
   e. 100-150 = 3.8% (1)
   f. 150+ = 7.7% (2)

3. What type of apparatus does your department operate (select all that apply)?
   a. Pumper = 100% (27)
   b. Aerial = 55.6% (15)
   c. Tender = 81.5% (22)
   d. Wildland = 88.9% (24)
   e. Heavy Rescue = 25.9% (7)
   f. Light Rescue = 70.4% (19)
   g. Command/Support = 81.5% (22)
4. Are you required by law or statute to possess a CDL to operate fire apparatus in your state?
   a. Yes = 22.2% (6)
   b. No = 74.1% (20)
   c. Don’t know = 3.7% (1)

5. Does your department train and/or certify apparatus drivers?
   a. Yes = 92.3% (24)
   b. No = 7.7% (2)

6. Please indicate the type of instruction provided for apparatus driver candidates by your department (select all that apply)?
   a. Classroom = 77.8% (21)
   b. Driving exercises = 81.5% (22)
   c. Practical Hands-on = 100% (27)
   d. Driver Skill Test = 66.7% (18)

7. What training curriculum does your department use (select all that apply)?
   a. VFIS = 32% (8)
   b. IFSTA = 64% (16)
   c. Department of Transportation (DOT) = 44% (11)
   d. Private Company = 8% (2)
   e. National Safety Council = 16% (4)
   f. Internally Developed (combination) = 40% (10)
8. How much class time is spent in apparatus driver training?
   a. 4 hrs = 32% (8)
   b. 6 hrs = 8% (2)
   c. 8 hrs = 12% (3)
   d. 10+ hrs = 48% (12)

9. Please indicate which types of hands-on training are required (select all that apply).
   a. Pre-Trip Inspection/Walk-Around (supervised) = 84.6% (22)
   b. Backing Skills (supervised) = 92.3% (24)
   c. Spotter Training (supervised) = 76.9% (20)
   d. Driving (supervised) = 96.2% (25)
   e. Defensive Driving/Accident Avoidance = 69.2% (18)
   f. Repair/Damage Reporting = 53.8% (14)

10. Do you feel that the Apparatus Driver-operator Training program in your department enhances recruitment/retention efforts?
    g. Yes = 37% (10)
    h. No = 18.5% (5)
    i. No opinion = 44.4% (12)
Appendix E

Elements of an Apparatus Management and Driver-Operator Training Program

1. A specific, written policy statement with the stated objective of prevention and elimination of death and injury, supporting safe operating procedures and guidelines. (NFPA, 2007b)

2. Standard Operating Procedures governing the following conditions, per NFPA 1500 (2007b) except as noted:
   a. Seatbelt use and maximum vehicle occupancy – apparatus specific
   b. Conformance of all apparatus to manufacturing requirements as defined in applicable NFPA Standards.
   c. Completion of an approved Driver-operator Training consisting of appropriate coursework and driving exercises outlined in NFPA 1002 (2003).
   d. Minimum passing score of 80% or better (Appendix B)
   e. Identification of licensing requirements by both the state of Wyoming and Fire District #1
   f. Emergency and non-emergency response policies
   g. Driving policies concerning traffic hazards, i.e. intersections, railroad crossings, driving against normal traffic flow, etc.
   h. Apparatus backing procedures
   i. Engine brake policies
   j. POV use and response
k. Apparatus inspections and testing. Frequency and content for each
   type of inspection or test specified
l. Repair and maintenance – reporting and procedures
   i. Unsafe “Red-Tag” conditions identified
   ii. Corrective action procedures
m. Driver eligibility notification procedures
n. Policies defining periodic skills and knowledge evaluation and
   continuing education requirements
o. Accident reporting and crash review
p. Disciplinary policies and procedures (Appendix A)
q. Physical evaluation for Apparatus Driver-operators annually
r. Drug and alcohol policy
s. Employee assistance program