

**Driver Operator Errors and their Effect
on Martin County Fire Rescue**

Strategic Management of Change

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ABSTRACT

Martin County Fire Rescue Training Bureau noticed an alarming trend with the Departments frontline Engines and Rescues. The frequency of driver operator error has sharply increased over the past two years, the overheating of diesel engines, the severe damage to brake systems and to the transmissions of all apparatus has caused a drain on the available rolling stock of Martin County Fire Rescue and is overworking the Support Services staff.

The purpose of this research project was to investigate and determine the cause of the driver operator errors. Descriptive and Action research methodology were used to answer the following questions:

1. What are the current maintenance problems of Martin County Fire Rescue Support Services related to driver error?
2. What is the level of driving experience and understanding of laws and regulations among new firefighters as compared to existing firefighters?
3. Has the mechanism for reporting driver operator error changed in the past two years?
4. What would be a good driver program for Martin County Fire Rescue?

The procedures used to complete this research project consisted of a literature review, an evaluation survey, two questionnaires and an interview of a sample group of Martin County Fire Rescue employees.

The results of this research project were that there was a definite problem with the new firefighters not having a grasp of the driving rules, regulations and laws. The new firefighters were checking the apparatus but were going through the motions. They did not understand what they were doing. The existing firefighters had a better grasp of the rules and laws, but had become complacent with their driving and checking out the

apparatus each morning.

As a result of this research project's information the Martin County Fire Rescue Training Bureau was able to develop a driver training program that addresses the needs of the Department. The program should be dynamic so that it can address the needs of the new firefighters that have little driving experience to the veterans that have many years on the job.

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INTRODUCTION

Martin County Fire Rescue Training Bureau and their staff noticed an alarming trend of apparatus being out of service or severely damaged due to driver error. The frequency of driver operator error has sharply increased over the past two years. The overheating of diesel engines, severe damage to braking systems, and severe damage to the drive train of apparatus was causing a drain on available rolling stock and on the personnel in support services. Since 1999 the Department has experienced a large influx of new firefighters. Starting in October of 1999 the Department hired twenty-four personnel, and in October 2000, thirty-eight personnel were hired. This added sixty-two new firefighters, coming from many different backgrounds and fire departments.

The purpose of this research is to investigate and determine the cause of the driver operator errors. Once identified and understood the information could be used to develop a driver training course for all department personnel.

This research project employed descriptive and action methodology to answer: (a) what are the current maintenance problems of Martin County Fire Rescue Support Services related to driver error; (b) what is the level of driving experience and understanding of laws and regulations among new firefighters as compared to existing firefighters; (c) has the mechanism for reporting driver operator error changed in the past two years; (d) what would be a good driver program for Martin County Fire Rescue.

BACKGROUND AND SIGNIFICANCE

Martin County Fire-Rescue is considered a medium size fire department by national standards and is located on the East coast of Florida. In 1980 Martin County's fire and medical services was two separate organizations. Martin County Fire Department and Martin County Emergency Medical Services. Most of the units were co-located in the same stations but had separate rules governing them. During that time all fire department personnel were trained to the Emergency Medical Technician level and were dispatched on most medical calls to assist. Likewise when Emergency Medical Services personnel responded to fires they set up rehabilitation for firefighters, they were not fire certified and could not do fire ground operations. The fire department firefighters were expected to be able to drive all emergency vehicles including the ambulances. The paramedics and emergency medical technicians from the emergency medical organization only drove the ambulances.

In 1993 the decision was made to bring both organizations together and form Martin County Fire-Rescue. Martin County Fire Department had eighty-four firefighters and Martin County Emergency Medical Services had fifty-nine medical personnel when the two systems combined. The medical personnel were all cross trained and were expected to drive all fire department apparatus. The support services personnel noticed an increase in brake, clutch and transmission problems.

As the paramedics and emergency medical technicians were trained on the job by the existing firefighters they started to adjust to driving larger and heavier apparatus, thus slowly reducing the problems with driver operator error, and support services went back to doing more preventive maintenance.

The department's manpower level remained at one hundred forty-three until October 1999. Two major events occurred, a devastating wildfire and losing firefighters to other departments over money. The County governmental body agreed in negotiations to hire twenty-four new firefighters for extra staffing. The following year the County signed a new contract and agreed to hire thirty-eight firefighters to reduce the workweek from fifty-six hours to forty-eight hours giving the firefighters a Kelly Day every twenty one days in the Counties pay cycle.

Starting in October 1999 the firefighters were hired in stages, this allowed the Training Bureau to hold five new-hire academies over a two-year period. Part of the class was an orientation to the apparatus and also a simplified driver course that each new firefighter had to successfully complete to graduate. All of the new firefighters that were hired had completed their field training and were functioning in their job classification by the end of February 2001. By June 2001 Support Services was being inundated with apparatus repairs that were driver operator mistakes. Things such as not checking radiator fluids, shattering clutch plates, and cracking brake drums.

The problem seemed evident that as new firefighters entered into the Department, from various backgrounds with various experience driving heavy vehicles, that driver operator errors are inevitable. If the problems exist with the new firefighters, the front line apparatus will spend more time in the shop then doing what they were intended to do, save lives and property. A change in the attitude of the way firefighters drive the Department's apparatus must take place or the Department's liability will skyrocket.

This research is based on unit 2 Change Management Module of the Strategic Management of Change course at the National Fire Academy.

LITERATURE REVIEW

What are the current maintenance problems of Martin County Fire Rescue Support Services related to driver error?

An interview was conducted with Captain Paul Davidson of Martin County Fire Rescue (Appendix A). Captain Davidson is a twenty-year veteran in the fire service and has been in Support Services for fifteen years. Current maintenance problems within the County are primarily the brush trucks. Martin County had a significant wildfire season and the trucks were used more than they normally are which has led to more problems that were directly related to driver operator errors. Four of the brush trucks lost clutches in the height of the season, one was so bad that it tore up the transmission. Most clutch repairs are due to the driver riding with their foot on the clutch or over revving the engines and engaging the clutches. Brake airlines have been ripped off, and one of the trucks was run without proper coolant and imploded the motor. The other problems Support Services sees is brake problems on our engines and rescues. The apparatus are coming in for brake jobs at a higher rate than ever before. This is due to the drivers not understanding air brakes and how the systems work. The drivers have a tendency to wait too long to apply the brakes when approaching intersections and with the greater weight they either pump the brakes or they apply full pressure to the system because the truck is not stopping fast enough. Most of the drivers are used to a passenger car or pickup truck not a forty-six thousand pound truck and they forget that it does not stop on a dime.

Those are the problems that happen in the field during fires or responding to calls. There is another whole list of things that are found when the trucks come in for preventive maintenance. Support services does a fifty-point checklist on all apparatus

that come in for service. Besides the obvious things such as changing oil, transmission fluid, checking the coolant for contaminants, air conditioning system and look for what is called the biohazard checklist. The mechanics look at the rescue and the engine upholstery for tears and rips as a place for bodily fluids to collect. Then the safety features of the truck are looked at such as the steering, seat belts, the self contained breathing apparatus holders to make sure they can be strapped in and secured. Also the body and component parts are looked at for stress cracks in the body and frame, they check door hinges, compartment door hinges and the way equipment is secured in the compartments. Support services went to such an extensive check list because the driver operators were not checking the safety items and were found by support services when the apparatus came in for preventive maintenance. Support services personnel developed all of these procedures and checklists that are currently being used.

What is the level of driving experience and understanding of laws and regulations among new firefighters as compared to existing firefighters?

To answer the first part of the question research had to be done on what are the various laws, rules, regulations, guidelines and standards that would influence the driving experiences of members of Martin County Fire Rescue. To answer the second part, a survey of a percentage of the department had to be done.

The emergency vehicle driver must possess fine coordination in controlling his vehicle and reacting to traffic problems. He cannot drive faster than traffic permits, nor should he drive faster than his ability to stop in an emergency. The right of way given to an emergency vehicle does not relieve him of his responsibility for the safety of all other users of the street (EVDT, 1991). Driving any type of emergency vehicle may be a

radical change for some people. It is even more of a complication if the type of vehicle is drastically different from a familiar experience. For instance an individual who has never driven a vehicle weighing over 3,500 pounds will have more to learn than just emergency vehicle driving procedures when placed in a 30,000 pound fire apparatus. Age is a component of driving an emergency vehicle, at age eighteen an individual usually only has a maximum of two years driving. As individuals get older the years of driving experience rises. The human aspects of driving an emergency vehicle may lead people to have a certain attitude towards driving. There is the immature driver, who only cares about his/her own safety, the show-off driver is more concerned about their image rather than reality, the laid-back driver is relaxed and that reactions to events may be slow or nonexistent, and then finally there is the comic driver who does not panic, they see humor in everything, even dangerous situations (EVDTP, 1998)

What laws did Martin County Fire Rescue fall under when driving emergency Vehicles? Chapter 316 of the State Uniform Traffic Control provides that the driver of an emergency vehicle, when responding to an emergency call but not returning from the fire may; proceed past a red or stop signal or stop sign but only after slowing down as may be necessary for safe operation. Exceed the maximum speed limits so long as he does not endanger life or property. Disregard regulations governing direction or movement or turning in specified directions, so long as he does not endanger life or property. The foregoing provisions shall not relieve the driver specified above from the duty to drive with due regard for the safety of all persons, nor shall such provisions protect the driver from the consequences of his reckless disregard for the safety of others (Florida Statute Ch. 316.072,1993). The driver of an emergency vehicle carries heavy

responsibilities for the safety of his vehicle, his comrades, and other vehicles and pedestrians along his route. He must be familiar with the traffic laws, particularly those that apply to him and his specialized driving capacity (EVDT, 1991).

Drivers of fire department vehicles shall have valid driver's licenses. Vehicles shall be operated in compliance with all traffic laws, including sections pertaining to emergency vehicles. Drivers shall be directly responsible for the safe and prudent operation of the vehicles under all conditions. When the driver is under the direct supervision of an officer, that officer shall also assume responsibility for the actions of the driver (NFPA 1500, 1997). An officer's obligation transcends that of the driver. A host of court cases have found officers responsible for the actions of the people they lead. By allowing an unsafe condition to exist or continue, officers are giving de facto consent for the condition to exist. The officer is just as responsible for the acts of subordinates as if he/she committed the act him/herself (Tippett, 1997).

During non emergency travel, drivers of fire department vehicles shall obey all traffic control signals and signs and all laws and rules of the road of the jurisdiction for the operation of motor vehicles. All fire department vehicles shall be inspected at least weekly and within twenty four hours after any use or repair, and prior to being placed in service or used for emergency purposes to identify and correct unsafe conditions (NFPA 1500, 1997). Drivers are responsible for keeping their fire apparatus in good operating condition (IFSTA, 1970). Every preventive maintenance program, from the one used for the family car to the largest fire department fleet, begins with the vehicle operator. Even the act of checking the gauges when the vehicle is in operation and detecting problems by sight and sound are considered operator

maintenance (Peters, 1995). One in every twelve vehicle mishaps is caused by vehicle malfunction and/or the lack of maintenance. In the final analysis, no matter who performs the actual maintenance on a vehicle, it is the driver's responsibility to confirm that the vehicle has been inspected. The driver must verify that the vehicle is in proper operating condition. The responsibility for the mechanical safety of an emergency vehicle is the driver of that vehicle (EVDTP, 1998).

Prior to operating a fire department vehicle the apparatus driver shall check the batteries for the correct fluid level, condition and tightness of all connections. They will check the pressure in the system prior to moving (p.s.i.), brake pedal (hydraulic), and if there is moisture in the system (bleed air). Look at the coolant level, hose connections, and any leaks noted. Turn on all lights, signals and audible warning devices and assure the voltmeter is operating correctly (NFPA 1002, 1998).

The survey (Appendix J) showed that the new firefighters hired by Martin County had little knowledge of the Florida laws, rules and statutes that govern their driving. They were more aware of the rules for driving their personal vehicle as opposed to driving fire apparatus. Existing firefighters were more aware of Florida laws, rules and regulations as it pertained to driving fire apparatus. It was also apparent that the existing firefighters had more experience driving heavy trucks prior to being hired, new firefighters had little to no experience.

Has the mechanism for reporting driver operator error changed in the past two years?

Support Services manually kept all maintenance records. A quality assurance report was done on the truck when the mechanic felt that the damage or mechanical

failure was due to driver error. This was kept in a file cabinet by the Support Services Captain. The problem with the system was it was the mechanics opinion against the driver of the apparatus. About three years ago Martin County went on the Hansen computer program in the Property Management Division. It was a program that tracked all of the Counties property. The program was introduced to support services to track all of the parts in inventory. The other function was that it was able to track the apparatus repairs and when the apparatus needed preventive maintenance and when parts were pulled from inventory and placed in the apparatus you could pull a report and tell what parts were replaced most often and at what frequency they were replaced. This helped keep better records on the apparatus. The County invested in a digital camera for support services, when we find items broke during the preventive maintenance we can now make a digital picture reference that is placed on the computer along with the other records. Our fleet of apparatus has been standardized as to the manufacturer and type of truck. Eighty percent of our engines are one manufacturer and one hundred percent of our rescues are the same manufacturer. The shop has purchased a new diagnostic computer to be used on all the apparatus. Before it was the mechanics word against the drivers, now there is no argument, it is undeniable. The mechanics can hook up the truck to the computer in the shop or out in the field and the truck will talk to the mechanic. The information we get now is mind boggling. The apparatus can tell you when it was low on oil, what time it went low and how long it stayed low before it was filled back to its recommended level. The system can tell you how fast the truck was going when the brakes were applied, how long they were applied and what pressure was placed on the system. With the systems that are at the disposal of the mechanics in support services

we can track any problems with the apparatus and who was driving it. By looking at the computer print out which gives us the day and time of any event we can check to see who was on duty that day and check the logbooks to see who was driving. This is not to point fingers at anybody, it is just another tool that is used in not only maintaining the trucks but also giving us data to use when we design our new apparatus.

What would be a good driver operator course for Martin County Fire Rescue?

The fire department shall provide, to all fire department members, driver training and education that are commensurate with the duties and functions members are expected to perform in order to ensure that they are able to perform their assigned duties in a manner that does not pose a hazard to themselves, other members, or the general public (NFPA 1451, 1997).

There are three parts of a good driving program; (a) the driver of the apparatus and those aspects which may influence performance; (b) regulatory requirements which have been established governing acceptable behavior; (c) the characteristics of the vehicle, which is the controlled aspect of driving safety (EVDT, 1991). Instituting a comprehensive emergency vehicle driver program is one method to attempt to ensure that all emergency vehicle drivers perform properly and professionally. A comprehensive driver training program provides direct evidence that the emergency service organization recognizes the consequences of inappropriate driver behavior. There must be an identified method for measuring proficiency. All fire department members shall be trained in, and shall exercise the applicable principles of, defensive driving techniques under both emergency and nonemergency conditions (NFPA 1451, 1997).

A comprehensive emergency vehicle driver training program should be comprised

of four parts: (1) a minimum of eight hours in the classroom to address the drivers' attitude, knowledge of laws, rules, regulations and standard operating guidelines. This should also include nonemergency driving situations; (2) a competency course to help build the drivers' confidence in the apparatus they will be driving. Some of the specific tasks should be the use of mirrors, turning the apparatus, backing the apparatus and breaking and stopping the apparatus; (3) at least eight hours of supervised driving in non emergency situations. It should include, as a minimum, the driving requirement and patterns as specified within sections 2-3 of NFPA 1002; (4) a written test should be administered relating to the topics in the classroom sessions (VFIS, 1997). It is noted that driver training should be an ongoing endeavor. Initial training, coupled simply with a driver's day-to-day experience is not enough to ensure competence, especially with emergency braking maneuvers, and when driving under adverse weather conditions. Driver operators should be certified for that duty and should recertify every three years (Rossman, 1994). It is recommended that driver's training should take place not less than twice each year (NFPA 1451, 1997). One additional step that fire departments can take to add legitimacy to any driver training program they might institute is to require that their driver operators obtain an appropriate commercial drivers license that is recommended in Standards for Fire Service Vehicle Operations Training Program (NFPA 1451, 1997).

Martin County Fire Rescues' organizational culture is broken down into four generations (Appendix C), people born before 1946 are known as the mature generation, people born between 1946 and 1964 are known as the baby boomer generation, people born after 1964 through 1976 are known as generation x and people born after 1976 through 1994 are known as generation Y (Loysk, 1997). The experience, skills and knowledge of incoming firefighters is different from what we have designed our training systems to accommodate. The technical literacy of new firefighters is lower,

their interpersonal experiences are different, and they were surrounded by different social and historical events (Martin, 2000).

Learning is any relatively permanent change in behavior that occurs because of experience. Learning provides the essential link between the past and future enabling an organism to adapt appropriately to changing circumstances in order to survive and thrive. It is a fundamental process in all animals, from the lowest backyard bug to the loftiest human scholar (Wade and Tavris 1993). According to the Learning Style Inventory (Kolb, 1999) there are two dimensions of learners “concrete-abstract or active-reflective.” When taking in new information that people characteristically choose between a concrete approach (sensing/feeling) and an abstract one (thinking), in processing what they take in. They also characteristically choose between an active orientation (doing) or a reflective one (watching). Repetitive, high-input training is becoming the norm. People do not quickly grasp the “new” set of skills we are presenting because they do not bring the background with them (Martin, 2000).

The pattern and arrangement of training opportunities must compliment and implement the philosophy of the organization. The program must stimulate growth in required knowledge, skills, habits, attitudes, encourages self-improvement and self direction. They must be built upon a firm foundation of precisely defined job performance requirements, which have been translated into specific learning objectives, that describe the behaviors, conditions and standards of performance (Williams, 1981).

PROCEDURES

This research project employed descriptive and action methodology to answer (a) what are the current maintenance problems of Martin County Fire Rescue support services as related to driver operator error (b) what is the level of driving experience and understanding of laws and regulations among new firefighters as compared to

existing firefighters (c) has the mechanism for reporting driver operator error changed in the past two years (d) what would be the best driver program for Martin County Fire Rescue.

Literature Review

The literature review started at the National Fire Academy's Learning Resource Center during June 2001 attendance. The literature review continued at the Martin County Fire Rescue Training facility library and the Martin County Public Library. The literature review looked at articles on the Internet, trade journals, training manuals, a survey of the department, an interview of the Support Services Captain and the National Fire Protection Association standards. All applicable sources were summarized and included in the literature review section of this paper

Interview

To answer two of the research questions an interview of Martin County Fire Rescue's Support Services Captain was done (Appendix A). The interview asked a series of questions about the current maintenance problems, driving habits, driver operator errors noticed during normal preventive maintenance, how support services captured data and statistics and recommendations for eliminating the driver errors.

Evaluation Surveys

Information was gathered on all bargaining unit employees of Martin County Fire Rescue. The search was to gather information on the names, birthdays and years of service with Fire Rescue. This was accomplished by using the Counties Banner accounting program, a system used by Human Resources to track data about all employees. From the information gathered the researcher was able to design the surveys

into specific fields to answer the research questions. The information was also used to come up with the sample group of employees to be surveyed. To pick the sample group the researcher found that twenty five percent of the Department had one year or less on the job. Fourteen members of the one year or less were chosen to be part of the sample group. The other thirty-nine members of the sample group were chosen at random from the existing workforce based on the number of years they had worked for Martin County.

A survey of the bargaining unit members was conducted. The first part of the survey broke down the department by gender (Appendix B). The second part of the survey broke down the department by generation (Appendix C). The third part of the survey broke down the department by years on the job (Appendix D). From the surveys two questionnaires were designed. The first questionnaire (Appendix E) was looking for information from the sample group on their personal driving history (Appendix F), the college level driver training courses (Appendix G) and their understanding of basic maintenance checks of fire department apparatus (Appendix H). The second questionnaire (Appendix I) was looking for the knowledge of laws and regulations of the new hire firefighter verses the existing firefighters (Appendix J).

Limitations

The limitations that affected this research was the lack of documentation of incidents of driver operator error. The research showed many articles and books about vehicle accidents, liability and how to avoid all of them. There was no source that gave any data on driver error and the affects it placed on a fire rescue system.

Definition of terms

Banner System: A program that manages all human resources and finances of Martin County.

Baby Boomer: Those individuals born between 1946 and 1964

Generation X: Those individuals born between 1964 and 1976

Generation Y: Those individuals born between 1976 and 1994

Kelly Day: A term used by fire departments when they reduce the workweek from 56 hours to 48. This means that one day each three week pay cycle the firefighter will have the day off with pay.

Mature Generation: Those individuals born before 1946

N. F.P. A.: National Fire Protection Association, a non profit organization used by private industry and the fire service to create standards for equipment, operations and firefighter safety and health.

Results

What are the current maintenance problems of Martin County Fire Rescue Support Services related to driver error?

An interview (Appendix A) was conducted with the Support Services Captain, the interview revealed that many of the firefighters that were hired over the last two years have been having the most problems. As the interview unfolded the Captain believed that the new hire firefighters came to work for Martin County with some bad driving habits and a definite lack of understanding of how fire apparatus work. He based this on conversations with the new hire firefighters when the apparatus was brought in for repairs and service. Some of the problems that were noted was a lack of understanding on how to drive the departments brush units which were all standard transmissions. It was noted that during our fire season four of our brush units lost clutches one was so bad that it destroyed the transmission. The personnel driving the trucks were inexperienced with off road driving and had a tendency to leave their foot on the clutch. This kept pressure on the clutch and wore them out. The other problem was over revving the engine and trying to engage the clutch. During the fire season there were brake lines

ripped off a truck, mirrors ripped off, dents placed in the body from hitting trees.

Another of the other problems noted was a lack of understanding of braking the larger heavier trucks. Trucks were coming in more frequently with brake problems. The Captain believed it was from driving too fast and when the apparatus approached an intersection, some personnel were waiting too long to apply the brakes and then they applied them with a very heavy foot. The other problem was personnel pumping the air brakes, similar to the way they would stop their personal vehicles. The Captain stated that the brakes on the apparatus were the most concern to him and his staff.

What is the level of driving experience and understanding of laws and regulations among the new firefighters as compared to existing firefighters?

It was evident in the literature review that a driver training program was required. Fire apparatus driver operators shall meet the requirements of the appropriate sections of NFPA 1002, *Standard for Fire Department Vehicle Driver/Operator Professional Qualifications*, chapter 3 through 7 and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, section 4-2, prior to being assigned as a fire apparatus driver operator (NFPA 1451, 1997).

A detailed survey of a sample group of the department was done. The survey looked at twenty-five percent of the department. Of the fifty-three personnel used as a sample group, fourteen of them were one year employees, the rest were made up from the existing group of firefighters from the twenty-two year veteran to the second year employee. Part of the survey (Appendix B) looked at the department make-up by gender, the department had two hundred-ten combat firefighters, of those one hundred-ninety

three were male and seventeen were female. The next survey result (Appendix C) divided the department by generation. The department had three male firefighters and one female firefighter that belonged to Generation Y, one hundred-twelve male firefighters and ten female firefighters were of generation X, seventy-six male firefighters and six female firefighters were part of the Baby Boomer Generation, two male firefighters were part of the Mature Generation. Another component of the survey was to look at the department by years on the job (Appendix D).

Using the information gathered from the surveys two questionnaires were developed. The first questionnaire (Appendix E) was designed to look at the sample groups personal driving history (Appendix F), their driving education (Appendix G), and their understanding of how to properly check department apparatus (Appendix H). The second questionnaire (Appendix I) looked at the sample groups understanding of laws, rules and regulations (Appendix J).

Has the mechanism for reporting driver operator error changed in the past two years?

According to the interview (Appendix A) conducted with the Support Services Captain, it has changed dramatically in the past two years. Support Services used to keep manual records of all maintenance including problems that were found to be driver operator error. They documented the problems with a regular camera of items that were found and also interviewed the drivers. This information was kept in a file cabinet and seldom was it pulled out to cross reference it.

In 1998 support services went on line with the Counties Property Management Control Divisions software, this software was to be used to track there parts inventory. However they discovered that the program would not only track the parts in and out of

the shop but also you could set up the program to have the apparatus as a parts room, so it would track what parts were on the truck, what parts broke and what parts were put back on it. This helped support services track problems with mechanical parts as well as cosmetic parts. They also received a digital camera that was used in the documentation of incidents where they felt the damage was done by driver error. They could now store the information on computer and retrieve information on the apparatus every time it came into the shop for maintenance.

The other enhancement that was talked about in the interview was that the new fire apparatus and rescues that have been purchased have on board computer systems. These systems were designed to enhance mechanic efficiency the apparatus comes into the shop or it could be in the field; the mechanic hooks up a laptop to the truck and it gives the mechanic a complete diagnostic output of what is wrong with the truck. It looks for everything from the taillights to the lights on the dash. It was also discovered that these diagnostic capabilities would let support services know when the truck was low on oil. The computer would date when the apparatus oil went below the full level and when the level went back up. What that means is that support services could track whether people were really checking their apparatus. This would also track motor revolutions, transmission temperatures and brake application in ratio to speed of the transmission. The old saying of “you can run but you can’t hide” now had a new meaning. All of this technology has improved the way that Martin County Support Services was able to track all driver operator errors.

What would be a good driver program for Martin County Fire Rescue?

Instituting a comprehensive emergency vehicle driver program is one method to ensure that all emergency vehicle drivers perform properly and professionally. There must be an identified method for measuring proficiency. All fire department members shall be trained in, and shall exercise the applicable principles of, defensive driving techniques under both emergency and nonemergency conditions (NFPA 1451, 1997).

The program should be comprised of four parts: (1) a minimum of eight hours in the classroom to address the driver's attitude, knowledge of laws, rules, regulations and Department policy; (2) a competency course to help build the driver's confidence in all of the apparatus they will be driving; (3) at least eight hours of supervised driving in nonemergency situations; (4) a written test should be administered relating to topics in the classroom, as well as a competency driving practical test (NFPA 1002, 1997). Martin County Fire Rescue has four different generations working within it, the Mature Generation, the Baby Boomer Generation, Generation X and Generation Y (Loysk, 1997). Learning is any relatively permanent change in behavior that occurs because of experience. The program must stimulate growth in required knowledge, skills, habits, attitudes, encourages self-improvement and self direction. They must be built upon a firm foundation of precisely defined job performance requirements, which have been translated into specific learning objectives that describe the behaviors, conditions and standards of performance (Williams, 1981).

Using the information and data gathered from the research project a driver program was developed for Martin County Fire Rescue. The program (Appendix K) was developed to assist all of the members of the department with their attitude towards driving, their knowledge of State and local laws, their understanding of how things work

on the apparatus both mechanical and electrical. The driver program was developed to assist the Instructors in working with the varied age groups of the Department.

DISSCUSSION

The support services interview (Appendix A) illustrated that there was definitely a correlation between the apparatus repairs and the new hire firefighters. The existing workforce had other problems that the mechanics dealt with, such as not doing thorough mechanical checks of the apparatus. The new firefighters that were in the department were checking the trucks but it seemed they did not know what they were checking or why they checked it. During questionnaire one (Appendix E) of the fourteen new firefighters that answered the questions only three had ever driven heavy trucks before they worked for a fire department. Eleven of the new firefighters worked for other fire departments but the problem was that they had never driven a fire engine. They were assigned to the ambulance. Three of the new firefighters had never worked for a fire department, this was their first job and the new hire academy was the first time they had ever driven fire department apparatus. The interview with the support services alluded to this problem with the new firefighters not having experience driving a fire engine. It also indicated a problem with the driver operator course that was used in the Departments Training Academy, it seems that not enough time was spent on the working parts of the apparatus and the systems that run the apparatus. Forty-five of the fifty-three people polled had been involved in some type of traffic accident with fourteen of them at fault. Seventeen of the personnel surveyed had a formal driving course, however all of the personnel had the Emergency Vehicle Operators Course. Even though a small number of the sample group had formal driver training all of the firefighters stated that they did spend time driving with their company officer. During questionnaire

two (Appendix I) it was learned that there definitely was some misconceptions within the department about driving the apparatus and the simple maintenance procedures. The fire department will provide to all members driver training and education (NFPA 1451,1997). All fire department vehicles shall be inspected at least weekly (NFPA 15001997). Drivers are responsible for keeping their fire apparatus in good working condition (IFSTA, 1970). The results of this research showed an interesting statistic, 51 % of the department is in the Baby Boomer Generation (Appendix C). Of that group 64% are company officers, and they will be eligible for retirement within three to eight years. This would be an immediate shock to the department. Also alarming is that when these seasoned company officers leave, they will be replaced with new firefighters that must be trained to drive the departments' apparatus however the new firefighters that will be in the job market will have less mechanical aptitude. The experience, skills and knowledge of incoming firefighters is different from what we have designed our training systems to accommodate. The technical literacy of new firefighters is lower (Martin, 2000).

As a result of this research project the Training Bureau must step up its efforts to design and implement a driver operator program for the department. One that is comprehensive enough to meet the needs of the department's members today but also one that will be useful to the new firefighters entering into the organizational culture of Martin County Fire Rescue.

RECOMMENDATIONS

Martin County Fire Rescue Training Bureau should develop a driver operator training program (Appendix L) for the firefighters that is innovative and dynamic to meet the challenges of a changing work force. The program should meet the requirements set forth in the NFPA standards, but also designed to fit the organizational culture of Martin County Fire Rescue. How many were asked when you were hired to climb a ladder or

perform other job related tasks. How many were asked to drive. Nearly every call you will make in your career will require the use of some sort of motorized vehicle, and yet the ratio of training for this metal monster is low when compared to other job functions in the firefighting profession (EVDT, 1991).

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APPENDIX A

Interview conducted with Martin County Fire-Rescue Support Services Captain Paul Davidson. Captain Davidson is a 20 year employee of the Department and is considered an Administrative position.

1. How long have you been doing maintenance on the apparatus of Martin County Fire Rescue?

Answer: I have worked for Martin County for twenty years. I started as a firefighter and then as a Lieutenant. I started working on fire trucks with a company in Delray Beach Florida. About fifteen years ago in 1985 the County asked me to start working on the engines on my days off and they would pay me overtime. By 1987 the County developed Support Services and got us a shop and we hired one other mechanic.

2. During the course of a calendar year, how many times do the following apparatus come in for preventive maintenance;

Answer:

- **Engines:** The engines usually come in about three times a year. The busy engines might come four times a year.
- **Ladder Trucks:** The ladder trucks come in about the same as the engines.
- **Rescues (ambulance):** These are the most run vehicles we have. They generally come in four to five times a year.
- **Brush Trucks:** Our brush units are seasonal and they come in once a year.
- **Tankers:** Like our brush units they don't get the hours so they come in once a year.

3. When the apparatus is in for preventive maintenance, how extensive of a check do the trucks go through?

Answer: We have a fifty-point checklist that each apparatus goes through. Obviously we check the drive train, transmission, coolant, the body, electrical system etc... We also have a standard safety check list that we put the apparatus through. Such as we look for anything in the cab of the trucks that might be a safety hazard to the firefighters, like loose equipment or self contained breathing apparatus that could come out of its harness in a rollover. Look for torn or worn seats that could hold bio-hazards, check the steering, air conditioning units. It really is an extensive check, it takes about a day to go through all of the checks.

4. Have you ever found problems with the truck that you could blame on driver error? If yes can you give some examples?

Answer: Yes, all the time. Well one of the biggest ones is the brush trucks, they all have a standard transmission. We go through clutches like crazy during the wildfire season. The next biggie is braking. Most of the drivers do not understand the weight to braking ratio of these heavy trucks. They also have a tendency to use up the brake pads. They are used to their personal vehicle with hydraulic brakes that they pump, pumping air brakes just destroys the system. Body damage is another thing, the trucks come in with nicks and dings but it seems that nobody knows who did it. I always hear it must have been the other shift. Then there are the vehicle accidents, most of them are minor, but related to driver error. Backing up with out spotters, going down a narrow street or driveway and damaging the truck. Then we had one that pulled through a drive in teller machine at the bank and took out the machine.

5. How many mechanics are in the shop at Support Services? Are they all certified mechanics?

Answer: Beside myself we have three full time mechanics, so we have four total. We keep fifty-eight apparatus on the road. All of the mechanics are E.V.T. certified (emergency vehicle technician) and three are A.S.E. certified. One is a certified diesel mechanic and one in electronics.

6. Have you ever noticed over your career in Support Services that there were times when driver error was more frequent than at other times? Did you have periods where there were peaks and valleys?

Answer: Yes; when we merged as a fire rescue system we had some people that had some bad habits and we noticed some problems. I guess on the job driver training took care of a lot of the problems. There was not a lot but it did occur just not as frequent. Recently over the past two years we have had problems.

7. In the past two years Martin County Fire-Rescue has hired 62 new firefighters. Have you noticed an increase in driver operator errors? If so can you give some examples.

Answer: Yes; with all the people hired the majority worked at other fire departments and they brought their bad habits with them. Others were on a rescue and never drove the engine or rescue. Because of this most of them do not have any idea of how things are supposed to work. I guess the biggest thing to say is it is like the little boy who cried wolf all the time, they complain about things that are wrong but when we get there the truck is fine.

8. As the Support Services Captain do you get a chance to go over the maintenance, driving, rules and regulations with the new hires? If so what are some of the things that you cover with them?

Answer: Yes; the Training Bureau gives me a full day to go over how to do the simple maintenance checks they are supposed to do each morning. I also go over the driving rules and regulations, our standard operating guidelines, stopping and driving the various trucks.

9. What are the current maintenance problems related to driver operator error in the past six months?

Answer: Well we just got out of brush season and we tore up four clutches, damaged the bodies on two trucks, ripped break lines off of another one. We also had someone run one of the diesel engines low on coolant and blow up the motor. We had someone run one of the Quints too hard and when they went to stop they pumped the brakes which are drums on the rear and over heated the entire system and cracked the brake drum into four pieces. In all my years I have never seen a drum break like that. I guess the other big one is small minor repairs that could be avoided if these people understood fire engines better.

10. Over your career in Support Services, how did you track maintenance and problems associated with driver error?

Answer: Well when I started I had to keep some sort of maintenance records for I.S.O.. I also started keeping track of vehicle accidents, minor body damage and cases where we felt it was driver error. We started a hand quality assurance program that we used to track certain maintenance trends with the trucks. We used to make the driver who damaged the truck and the officer fill out the quality assurance report. Then I entered everything in on a computer, it was primitive.

11. Has the method of tracking these statistics changed in the past two to three years?

Answer: Oh yeah it is top of the line now. We have a new computer program that tracks every vehicle for maintenance, what has been done what needs to be done. We have also standardized our engines, rescues, brush trucks so our parts are the same. Now 80% of our fleet has the new on board diagnostic computer systems. We can plug in the truck to our computer and the computer will tell us everything that went on in the truck. There is no more hiding let me list some of the things this will do:

- a. Tell when the truck was started and when it turned off and what temp the engine got to.
- b. How fast the truck was going when the brakes were applied and how long and hard they were applied.
- c. When the truck was low on any fluid, and when the fluid was added.

Now we can tell what shift the oil or other fluids were low, how many shifts before somebody fixed it. In other words they can run but they can't hide any more. We have the technology to find out what type of driving conditions the truck was subjected to when it broke. One of the other things we do is photo document all driver operator incidents, no matter how small. We use a digital camera and place the picture documentation in the file with the Quality Assurance report.

12. As the Support Services Captain do you have any input into how the Department's new apparatus are built?

Answer: Yes I do. We have an apparatus team that is made up of members of the Union, Administrative staff and myself as the team leader.

13. Now that you have input, what are some of the mechanical and physical specifications you have added to counter driver operator error?

Answer: Well let's take the engines that we buy now. We went back and pulled up all of our Q.A. files on engine problems, it showed a quite a few problems. Such as the way we secure air packs in the cab, we no longer place tools of any kind in the cab. We went to fold down brackets for our ladders and pike poles which eliminated a lot of body damage. We went to a side mount pump with mechanical throw levers as opposed to a top mount pump with electronics. We also have pressure governors instead of pressure relief valves. We also look at compartments and tools stored and revamped all of them to fit the needs of the firefighters that were using it. The rescues were redesigned with better rear air conditioners for patient comfort, bigger compartments for their gear. We went to bigger chassis and engines to allow for heavier driving.

14. Have you seen a change in the attitude of the new hire firefighters as it pertains to checking the trucks, maintaining the trucks and driving the trucks?

Answer: Yes and no. I don't blame the new firefighters as much as I blame the company officers they work with. The company officers that are high and tight and take charge of their shift, the new firefighters assigned to them do a much better job of driving and maintaining the equipment. However just like any fire department there are a few bad company officers that are lazy and don't care, and that is a problem. Just our organizational culture lends itself to be a problem we put these new firefighters behind the wheel too quick, they don't get enough training time.

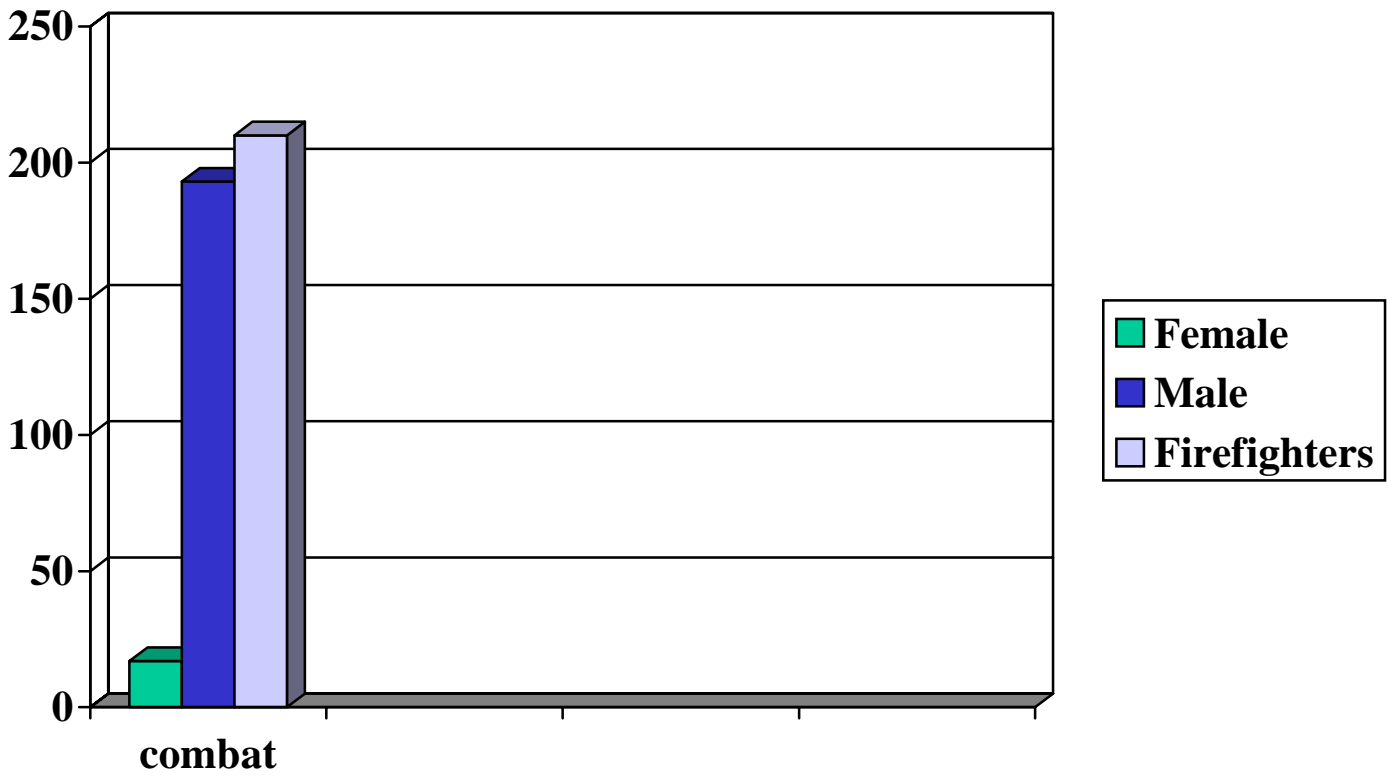
15. Do you think a formal driver operator program will help eliminate some of the problems you see in Support Services?

Answer: Yes, emphatically yes, yes!

16. What do you think needs to be part of that driver program that will help reduce driver operator error?

Answer: A complete understanding of the truck they are driving. They need to understand the mechanical, electrical and pumping systems of the truck. Not only how it works but also why it works in a certain way and how to diagnose what the problem is. The reason I say this is you would not believe the work orders we get, they can't explain what is wrong with the apparatus because they don't understand it. Unfortunately we can't teach common sense, but we need to educate and train one specific person to drive and maintain the truck. That way if there is something wrong they can help with the diagnosis and we won't be on an Easter egg hunt.

APPENDIX B



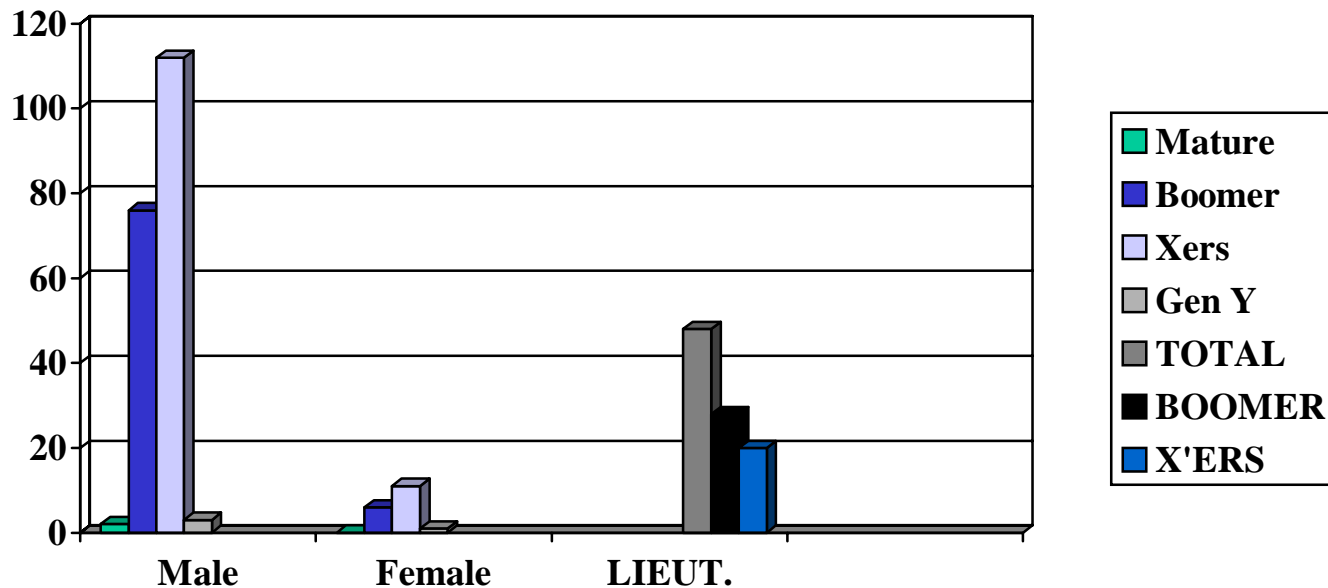
Breakdown of Martin County Fire-Rescue by Gender *

Key:

- Firefighters Combat firefighters 210
- Male Male Gender in Combat 193
- Female Female Gender in Combat 17

* Does not include Administrative Staff or Volunteer Forces. Only Bargaining Unit Members

APPENDIX C

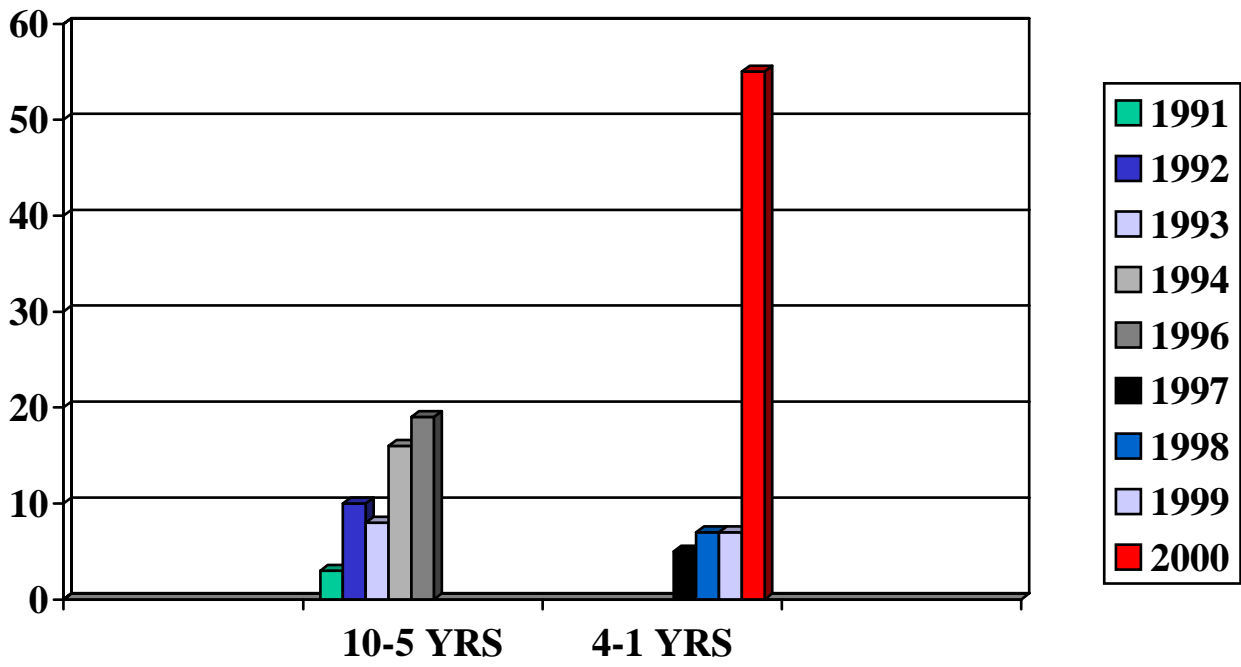
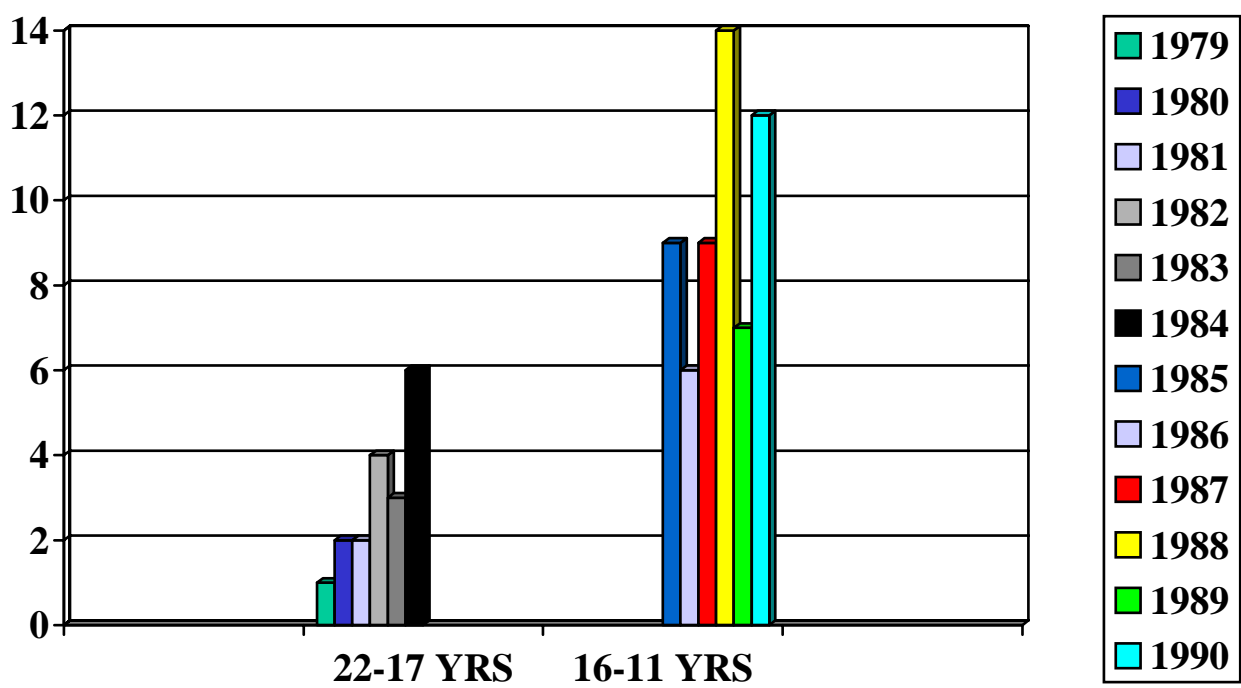


Breakdown of Martin County Fire-Rescue by Generation

Key:

- Mature 2 Male Firefighters of the Mature Generation
0 Female Firefighters of the Mature Generation
- Boomer 76 Male Firefighters of the Baby Boomer Generation
6 Female Firefighters of the Baby Boomer Generation
- Xers 112 Male Firefighters of the X Generation
10 Female Firefighters of the X Generation
- Gen Y 3 Male Firefighters of the Y Generation
1 Female Firefighter of the Y Generation

APPENDIX D



Breakdown of Martin County Fire-Rescue by Years on the Job

APPENDIX E**Questionnaire 1**

Personal Information

Date of Birth		Age		Years on the Job	
---------------	--	-----	--	------------------	--

How long have you been driving	
--------------------------------	--

What type of drivers license do you currently hold	
--	--

What type of vehicle do you drive (S.U.V., P/U TRUCK etc..)	
---	--

Is your personal vehicle a standard or automatic transmission	
---	--

Before working for the Fire Department, have you driven heavy duty trucks over 14,000gww
--

YES		NO	
-----	--	----	--

If you answered yes, briefly explain what type and how long you drove them
--

Have you ever been in a vehicle accident?	YES		NO	
---	-----	--	----	--

Were you found to be at fault?	YES		NO	
--------------------------------	-----	--	----	--

If you answered yes, briefly explain what happened
--

Do you perform maintenance on your vehicle?	YES		NO	
---	-----	--	----	--

If you answered yes, briefly explain what you do
--

Professional Information

How long have you worked for Martin County Fire-Rescue	
--	--

Have you worked in another Fire Rescue System	YES		NO	
---	-----	--	----	--

How long?	
-----------	--

Have you worked for a Private Ambulance Co.	YES		NO	
---	-----	--	----	--

How long?	
-----------	--

Have you had E.V.O.C. ?	YES		NO	
-------------------------	-----	--	----	--

The course was how many hours?	16	24	40
--------------------------------	----	----	----

Have you had a formal Driver Engineer Course?	Yes		No	
---	-----	--	----	--

If you said yes please check the appropriate box
--

Martin County Fire-Rescue Academy	
Martin County Fire-Rescue Training	
Community College Fire Course	
Florida State Fire College	
Other	

Have you had Support Services Orientation to new trucks?	YES		NO	
--	-----	--	----	--

Since being on shift, have you had Driver Training with the Company Officer?
--

Yes		No		If yes how many hours?	
-----	--	----	--	------------------------	--

Do you have a complete understanding of the Fire Apparatus that you drive as it pertains to:
--

Checking Fluids and importance of	Yes		No	
-----------------------------------	-----	--	----	--

Checking Belts and Tires, pressure	Yes		No	
------------------------------------	-----	--	----	--

Checking Brakes and adjusters	Yes		No	
-------------------------------	-----	--	----	--

Checking Body for Damage	Yes		No	
--------------------------	-----	--	----	--

Checking Drive Train	Yes		No	
----------------------	-----	--	----	--

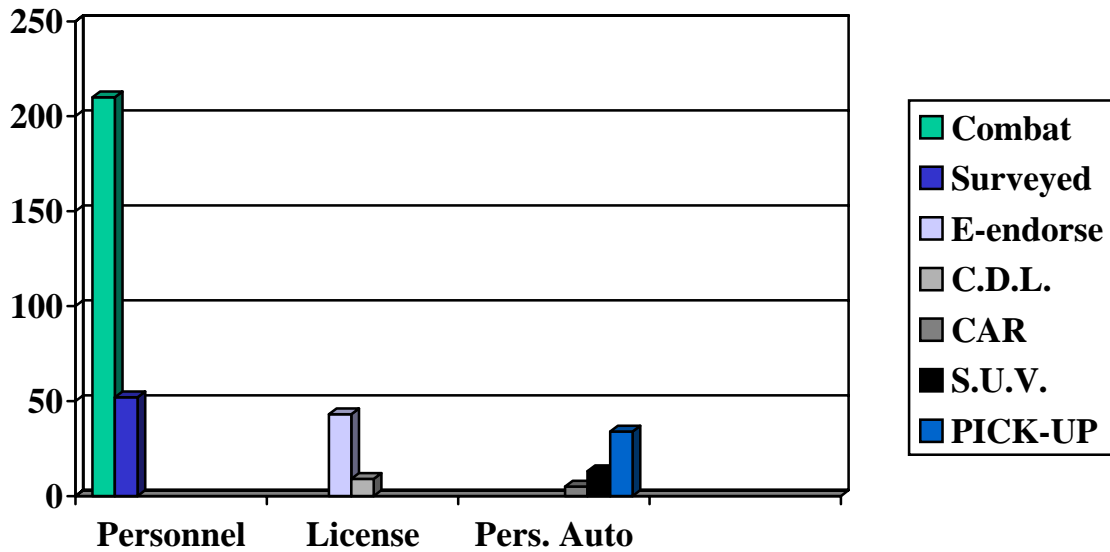
Understanding driving laws-rules	Yes		No	
----------------------------------	-----	--	----	--

Stopping distance of various trucks	Yes		No	
-------------------------------------	-----	--	----	--

Driving Brush trucks in the woods	Yes		No	
-----------------------------------	-----	--	----	--

APPENDIX F

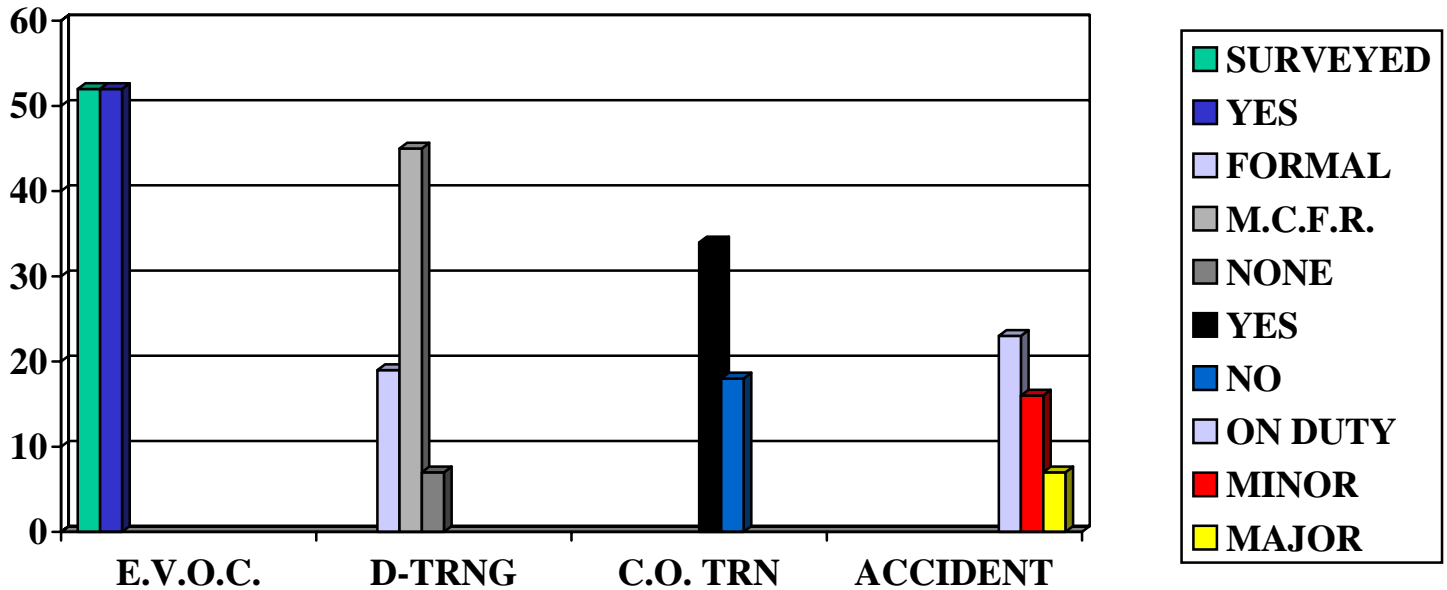
Results for Questionnaire # 1



Personal Driving of Surveyed Members

APPENDIX G

Results for Questionnaire # 1

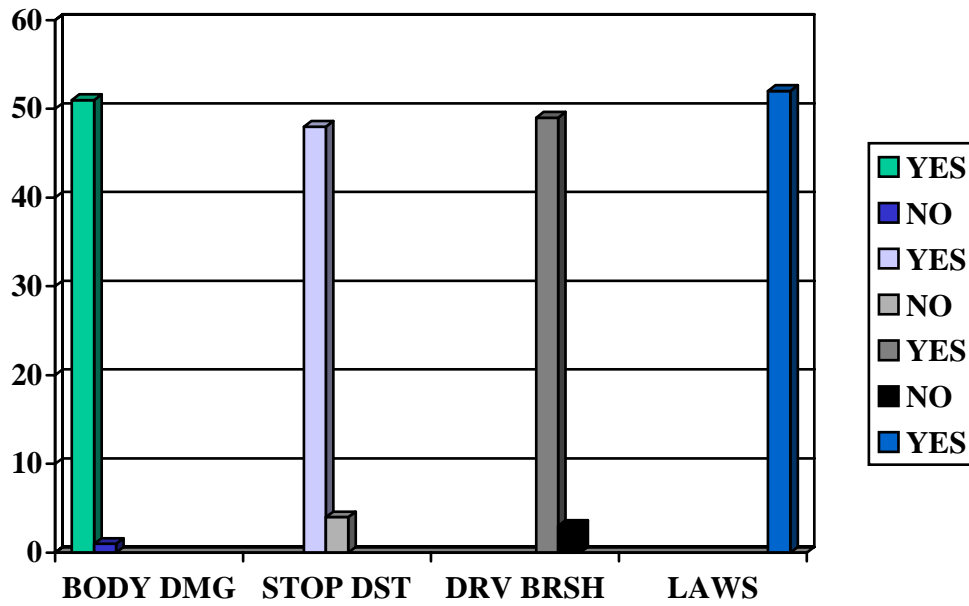
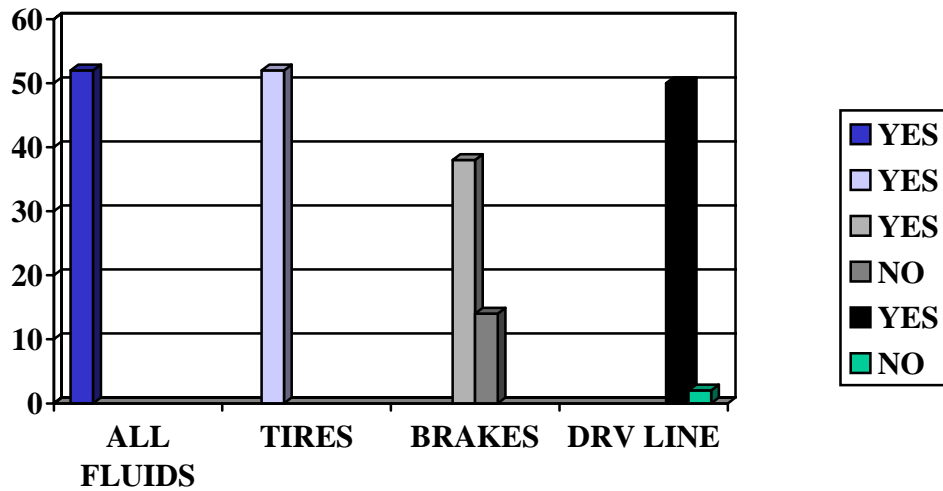


Professional Driving History of Surveyed Members

Key:

- E.V.O.C. Emergency Vehicle Operators Course 16 to 24 hours
- D-TRNG Driver Training Formal at the State Fire College or
Martin County Fire-Rescue Training Bureau
- C. O. TRN Company Officer training at the station level
- Accident While driving County Vehicles, Fire Trucks, Ambulances
Tankers, Brush Trucks, Ladder Trucks and Utility vehicles

APPENDIX H



Participants Understanding of Driver Operator Vehicle Maintenance Procedures and Laws

Key:

- All Fluids Oil, transmission, radiator, brake, window
- Tires Pressure, tread wear, sidewall damage
- Brakes Mushy or hard, slack adjusters on air brakes
- Drv Line Drive line, drive shaft, slop or play in the shafts
- Body Dmg Body Damage to the apparatus
- Stop Dst Stopping Distance of the Departments Apparatus
- Drv Brsh Drive Brush Trucks in the Wildland
- Laws Driving laws that apply to Emergency Vehicles

APPENDIX I**Questionnaire 2**

Does Martin County Fire-Rescue have a S.O.G. on driving	YES		NO	
---	-----	--	----	--

If you answered yes do you know the number	
--	--

Are there guidelines and procedures on how to do truck checks	YES		NO	
---	-----	--	----	--

Do you know how to report out of service trucks and equipment	YES		NO	
---	-----	--	----	--

What is the width of the Engine	
---------------------------------	--

What is the width of the Rescue	
---------------------------------	--

What is the gross vehicle weight of an engine carrying 750 gal. of water	
--	--

To your knowledge does N.F.P.A. 1500 have requirements for Driver Operators	
---	--

YES		NO	
-----	--	----	--

Are you familiar with N.F.P.A. 1002 fire apparatus drivers	YES		NO	
--	-----	--	----	--

Can you exceed the speed limit?	YES		NO	
---------------------------------	-----	--	----	--

Can you drive opposite traffic?	YES		NO	
---------------------------------	-----	--	----	--

Can you stop or stand anywhere you want on the roadway?	YES		NO	
---	-----	--	----	--

Can you run red lights and stop signs?	YES		NO	
--	-----	--	----	--

At what R.P.M. should you shift gears on the brush trucks?	
--	--

When driving the brush trucks you should keep your foot on the clutch at all times	
--	--

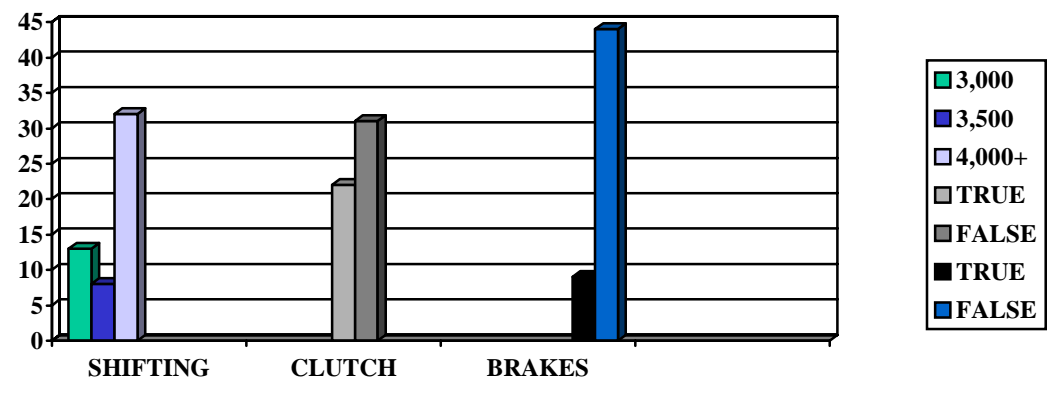
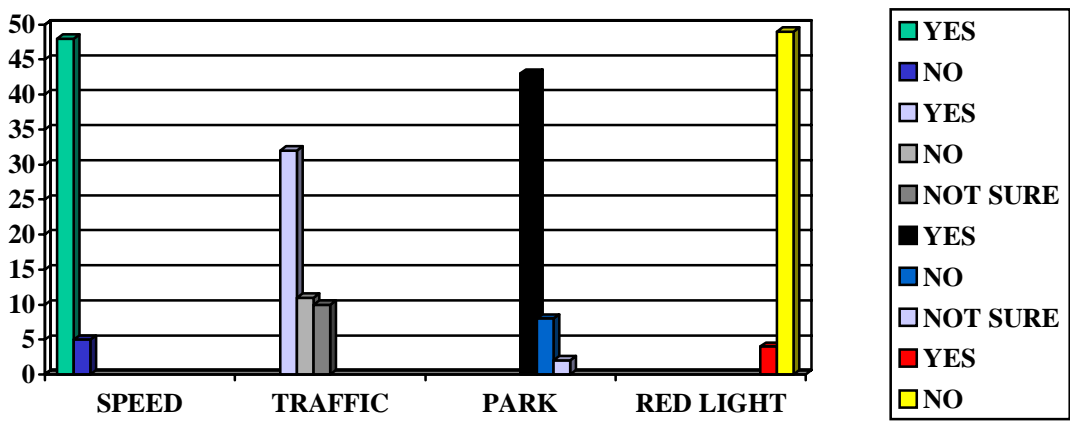
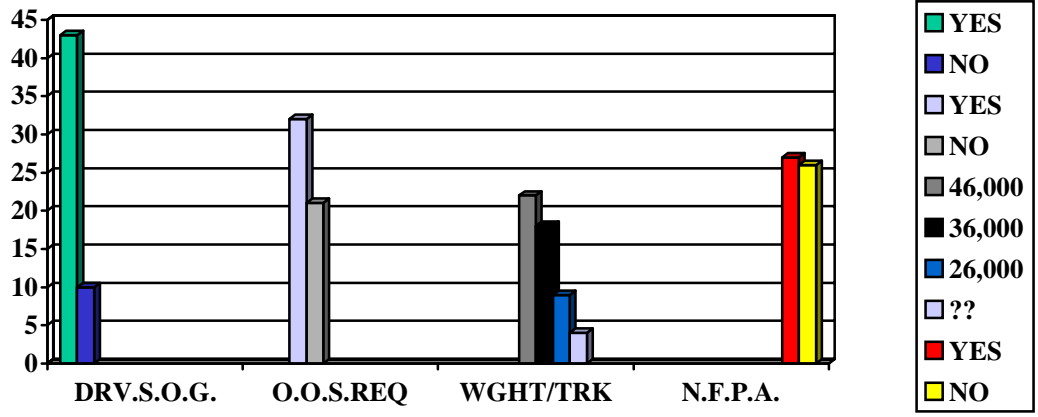
TRUE		FALSE	
------	--	-------	--

When driving apparatus with air brakes, to stop you must pump the pedal	
---	--

TRUE		FALSE	
------	--	-------	--

APPENDIX J

Results of questionnaire two



Key:

D.R.V.S.O.G.:	Do they know that the Department has a guideline for driving
O.O.S. REQ :	Do they know how to send in a request for repairs on apparatus
WGHT/WRK:	Do they know what the weight of the fire apparatus is
N.F.P.A.:	Do they have knowledge of the three standards governing the driving of apparatus
SPEED:	Do they know the department rules about speeding
TRAFFIC:	Do they know the rules about driving against traffic
PARK:	Do they know the rules about stopping or standing on the highway
RED LIGHT:	Do they know the rules for running red lights and stop signs
SHIFTING:	Do they know at what R.P.M.'s they should shift standard transmission vehicles
CLUTCH:	Do they know about driving with their foot on the clutch
BRAKES:	Do they know how to utilize air brakes

APPENDIX K

Martin County Fire Rescue
Bureau of Training and Safety



Emergency Vehicle
Operators Course



Preface

The course you are about to take has three parts. The first is a self appraisal test so you can gain an understanding of what you know and what you may need to know. The second part is a self study course on laws, rules, regulations and department policy as it pertains to driving Martin County Fire Rescue Apparatus. The third part will be a driving practical with one of the Training Officers that have been certified as driving instructors.

As an apparatus operator, your role is critical to the success of Martin County Fire Rescue. As we go through our careers we train on all facets of our profession, we train on medical knowledge skills and abilities; we train on fire knowledge skills and abilities, but we don't train on driving. Driving is one of the most important things that we do every day that we are on shift. Yes we may use some of our medical or fire skills each shift however we will use all of our knowledge skills and abilities driving to and from every call we go on.

<u>Name</u>	
-------------	--

<u>Rank</u>	
-------------	--

<u>Station Assignment</u>	
-------------------------------	--

<u>Self Appraisal Score</u>	
---------------------------------	--

<u>Practical Score</u>	
------------------------	--

Self Appraisal Test

1. Because of their weight and size, fire apparatus and rescues rarely hydroplane.
 TRUE FALSE

 2. It takes longer to stop an apparatus traveling downhill than it does to stop on level pavement.
 TRUE FALSE

 3. Average driver reaction time is about _____ of a second.

 4. What factors make up your total stopping distance?

 5. The posted speed on exit ramps is safe for fire apparatus
 TRUE FALSE

 6. When driving fire apparatus how far should you scan down the road?

 7. Because fire apparatus are so high, they have few blind spots
 TRUE FALSE

 8. Seatbelts are of limited use in Engines and Rescues
 TRUE FALSE

 9. If you are behind another fire apparatus when responding to an alarm, you are safer than if you are the lead apparatus
 TRUE FALSE

 10. When more than one apparatus are leaving the fire station, it is recommended that the second apparatus move onto the apron before the first one leaves
 TRUE FALSE

 11. As they relate to each of the topics bellow, list some of the major differences between the fire apparatus and a passenger car:
- | | Fire Apparatus | Passenger Car |
|-------------------|----------------|---------------|
| Turning Radius | _____ | _____ |
| Blind Spots | _____ | _____ |
| Braking Distance | _____ | _____ |
| Center of Gravity | _____ | _____ |

12. The Standard Operating Guideline for Driver Operator is:
- 21
 - 36
 - 56
 - 52
13. When the apparatus is out of the station the driver will ensure that the emergency brake and wheel chocks are deployed when parked.
 _____TRUE _____FALSE
14. When Fire Rescue Apparatus must travel in the center of oncoming lanes the maximum speed is 50 m.p.h.
 _____TRUE _____FALSE
15. When approaching a negative right-of-way intersection (red light, stop sign) the vehicle shall be allowed to go through the intersection as long as they have a visual and audible warning device sounding.
 _____TRUE _____FALSE
16. Personnel riding in Martin County Fire Rescue apparatus do not have to wear seat belts as long as they are wearing their fire helmet.
 _____TRUE _____FALSE
17. The Officer in Charge is ultimately responsible for the safety of all vehicle operations.
 _____TRUE _____FALSE
18. When the Engine and Rescue are started for the morning check out, it is acceptable to pull them out of the bay and shut them down.
 _____TRUE _____FALSE
19. What does the phrase “driving with due regard for the safety of others” mean to you?

20. While on the road responding to an alarm, you spot a school bus stopped ahead on the right with lights activated, discharging students. Describe how you would...
- approach the bus: _____

 - pass the bus (if you would): _____

LEGAL

As an Emergency Vehicle Operator you will have three types of regulations to follow:

- Motor vehicle and traffic laws enacted by the state government
- Local ordinances (speed limits)
- Departmental policy and guidelines about what you as an Emergency Vehicle Operator may and may not do

It is important that you understand the following basic principles of Emergency Vehicle Operation before considering the specific statutes, which apply.

- The operators of all Emergency Vehicles are subject to all traffic regulations unless a specific exemption is made in the state or local statutes. The specific exemptions made in the statutes refer to an Emergency Vehicle only when it is operated in the emergency mode.
- Even when a specific exemption is made under the relevant statute, you can be held criminally and/or civilly liable for your actions should you become involved in an accident where property damage, injury, or loss of life occur.

NFPA 1500 Fire Department Occupational Safety and Health, Chapter 4 states: “drivers of fire department vehicles shall have valid driver’s licenses. Vehicles shall be operated in compliance with all traffic laws, including sections pertaining to emergency vehicles, and any requirements of the authority having jurisdiction”. Drivers of fire department vehicles shall be directly responsible for the safe and prudent operation of the vehicles under all conditions. When the driver is under direct supervision of an officer, that officer shall also assume responsibility for the actions of the driver.

Interpreting the Law

If you are involved in an accident where property damage, injury, or loss of life occurs, your actions will be evaluated and judged by your superiors. In some cases your actions may be judged in a court of law. A court will judge your actions from at least two aspects: (1) was the situation you were responding to a true emergency? (2) did you exercise due regard for the safety of others?

How not to be blamed

You will greatly reduce the chances of being found guilty of negligence if you follow these guidelines. Be reasonably certain that a situation represents a true emergency before exercising the exemptions granted to you in state statute.

You should be able to answer “yes” to the following questions:

1. Is there a high probability that this situation could cause death or serious injury to an individual?

2. Is there significant property imperiled?
3. Could action on my part reduce the seriousness of the situation?

Once you have made the decision to treat a situation as a true emergency, remember that under all circumstances you must exercise due regard for the safety of others. There is an old phrase often used in driver safety courses, “The Law Applies To Me”. Remember that the next time you are tempted to take a chance. Condition yourself, because the law and all implications apply to you, not just the other guy.

THE BIG PRINT GIVES IT TO YOU, the little print takes it away

Congress, the State Legislature, and local government prepare laws, which give us the authority to operate and exceed certain rules, which govern the general public. Where the operation involves risk, this is also provided for. They pass the buck, or risk, back to us. That risk should cause us to govern ourselves with “due regard for the safety of all persons”.

BIG PRINT

Did you know that according to State Statute that while you are responding to an alarm, you may:

- Park or stand your vehicle irrespective of all other laws to the contrary
- Proceed past red lights and stop signs
- Exceed the maximum speed limits
- Disregard regulations governing the direction of movement of traffic or turning specific direction regardless of posted signs or regulations to the contrary

Sounds far reaching, doesn't it? It sure is. How would we ever operate without these latitudes? It simply makes sense that to respond to an emergency where seconds count, we must be allowed some leeway.

little print

In the last paragraph of the law that allows us all those necessary latitudes also places the responsibility to drive safely back into the drivers seat.

“The foregoing provisions shall not relieve the driver of an authorized emergency vehicle from the duty to drive with due regard for the safety of all persons, nor shall such provisions protect the driver from consequences of his reckless disregard for the safety of others”.

NFPA 1500 Fire Department Occupational Safety and Health Program

Chapter 4-2.7

During emergency response, drivers of fire department vehicles shall bring the vehicle to a complete stop under any of the following circumstances:

- (a) When directed by a law enforcement officer

- (b) Red traffic lights
- (c) Stop signs
- (d) Negative right-of-way intersections
- (e) Blind intersections
- (f) When the driver cannot account for all lanes of traffic in an intersection
- (g) When other intersections hazards are present
- (h) When encountering a stopped school bus with flashing warning lights

Concepts of Defensive Driving

Defensive driving is largely a matter of attitude, the determination on your part to do everything reasonably possible to avoid being involved in a preventable accident, regardless of what the law says, what the other driver does, or the adverse driving conditions you encounter.

Knowledge: Do you know the traffic rules and regulations of the State of Florida? Are you aware of proper procedures for passing, yielding the right of way, and other maneuvers you'll be called upon to perform when you are behind the wheel?

Alertness: Are you aware of what is going on around you? Are you conscious of traffic conditions ahead? Do you occasionally glance from side to side and at the side and rearview mirror?

Foresight: Do you "look ahead" when you drive? Can you predict what is likely to happen? Foresight includes both short and long range predictions, such as getting ready to stop when you see a traffic light ahead and making a pre-trip mental inventory of driving conditions.

Judgment: Another word for good common sense. Judgment involves knowing what to do and doing it at the right time....every time.

Skill: Do you know how to handle the vehicle you are driving? How to start, stop, turn, go forward and in reverse, and how to execute various emergency maneuvers? Research has shown that skill is not simply the result of practice, but the result of training plus practice.

Admission of Guilt: If we do not create a problem for other drivers and are diligent and totally responsible, there will be no danger, correct? Individual drivers must be the guilty ones- we are where the problems really start. Each must admit that driving problems start with themselves.

Generally speaking, good pianists get stiff fingers if they don't practice; good batters go into a slump because they had quit doing something that helped them become good hitters; good pitchers lose control because they are either doing something they shouldn't or failing to do what they should; boxers develop a bad habit and their downfall

is swift; golfers develop a slice because they stop doing something they have been taught to do. All of this brings up two points, which are just as true in our daily job as in the activities mentioned. The first is that, whether we like it or not, success comes from being taught how to drive correctly, and second, from constant practice under a critical eye to correct any faults we may have developed. There is no reason to assume that you know everything about driving, especially if you have had no special training in it. Even if we were to grant that you have had the best training and at one time knew all there was to know about driving, there is no assurance that you will keep doing it right without frequent checking.

Experience improves your driving, provided it is the right kind of experience. Certainly, experience in running red lights, violating the speed limits, passing on bridges, and following too closely is not the kind of experience that will help you drive safely. You must have the right kind of experience, which comes from daily practice in the art of driving safely.

Putting all the reasons together, it always comes out the same; we have to learn the right way and we have to practice it daily if we want to stay right; in driving, right means staying alive.

The fire department driver must maintain a safe driving attitude regardless of the contributing factors, which may tend to influence them. A good attitude is possibly the most important requirement of being a good driver. Drivers' attitudes are reflected in their mental or emotional regard for themselves, for others, for their vehicle, and for surrounding conditions.

Some drivers are mentally unequipped to drive under emergency response conditions. Some develop a "superman" complex such as complete disregard for the rights of others, demanding and expecting the right of way under all conditions and circumstances, and others have poor driving habits that have never been corrected.

The majority of accidents are caused by human failure. Many accidents attributed to faulty equipment or bad driving conditions are actually a matter of driver failure. Some types of human failure include:

- Carelessness
- Incompetence
- Recklessness
- Inattentiveness
- Inability to judge distance
- Slow reaction of drivers

A driver with a poor attitude usually has some excuse for any accident he/she is involved in, such as "the street was poor," "the other driver was wrong," "the intersection was blind," "I had the right of way". Every apparatus driver owes his/her fellow firefighters a safe ride each time the apparatus moves, whether a routine inspection or responding to a two alarm working fire.

Defensive drivers expect to make allowances for the mistakes of others. They keep constantly alert and think far enough ahead to be able to take necessary preventive action before dangerous situations cause accidents. Defensive drivers adjust their driving to meet all hazards of weather, road, traffic and other conditions.

Driving unconsciously

Habit is a wonderful thing. Good driving habits are helpful. There are many things such as shifting gears, applying brakes and feeding gas that are best done by habit. We would be in bad shape if we had to stop and think about each particular action necessary in running a vehicle. Habits are useful in helping us do routine things, but we should not drive unconsciously and expect habits to take us through.

Martin County Fire Rescue Standard Operating Guidelines

For the following section please get our the Station copy of Guidelines to review the following;

- | | | |
|-------------|----------------------------|-------------------------------|
| • S.O.G. 1 | section 3.5 | Standards of Performance |
| • S.O.G. 3 | section (s) 5, 6, 7, 8, 12 | Personal Protective Equipment |
| • S.O.G. 14 | section (s) 1, 2 | Daily Apparatus Operations |
| • S.O.G. 52 | section (s) 1, 2, 3, 4, 5 | Driver/Operator Guideline |
| • S.O.G. 54 | section (s) 1, 2, 3, 4 | Aerial Apparatus |

The Apparatus Braking System

As all of you are aware we have several different types of apparatus that you may be required to drive during the course of your shift. The following information applies to the majority of our apparatus except the utility trucks that are ½ ton or ¾ ton pick up trucks. All of the utilities have ABS braking systems. The following will apply to the Engines, Tankers, Aerials, Rescues and eight of our ten Brush Trucks. If you have thoroughly gone over the guidelines you should all be familiar with the vehicle check sheets and the appropriate checks that must be performed each day. However the following information is not covered with the guidelines.

- **Air Compressor:** The air compressor pumps air into storage tanks. The air compressor is connected to the engine through gears or by a fan belt. The air compressor may be either air cooled or cooled with engine coolant.
- **Air Compressor Governor:** Controls when the air compressor will pump air into the storage tanks. When the air pressure reaches the cut off level of 125 p.s.i. the governor stops the compressor from running. Likewise when the pressure drops below 100 p.s.i. the governor allows the system to refill.

- Air Storage Tanks: They are used to hold and store air used in the brake system. The number and size of the tanks can vary among our apparatus. However the tanks will hold enough air to stop the truck, or at least allow the use of the brakes several times even if the compressor stops functioning.
- Automatic Air Drain System: All of our new apparatus have automatic purging systems. Some of the older apparatus has to be done manually. As air is pumped into the storage tanks moisture or condensation builds in the tanks. If the system is not purged the tank will fill up with this moisture and not allow enough air in the tanks for them to be effective.
- Foot Brake or Treadle Valve: Application of the brakes is made by pressing on the brake pedal. Pushing the pedal harder applies more air pressure to the system. Likewise letting up on the pedal releases air pressure from the system, and allows for the release of the brake system. When you let up on the brake pedal you allow air to escape from the system, this causes the air compressor to activate to continually replace the air as it is used.
- Low Air Supply Warning Device: This device is required on all vehicles that have air brake systems. A warning signal that can be seen and heard by the driver must activate when the pressure in the system drops below 60 p.s.i. Once the pressure drops below 60 p.s.i. and the system activates the apparatus will not move until the pressure rises above the 60 p.s.i. level.
- Parking Brake: The parking brake is activated by a yellow diamond shaped push pull control knob. You pull out the knob to activate the parking or spring brakes, and depress the knob to release them. **DO NOT PRESS ON THE BRAKE PEDAL WHEN THE PARKING BRAKE IS ACTIVATED.** The combined force of the air and the spring pressure can damage the brakes.
- The S-Cam Brake System: When you press the brake pedal, air is passed into the brake chambers. Air pressure pushes a rod out, moving the slack adjuster, thus twisting the brake camshaft, this turns the s-cam. The s-cam forces the brake shoes apart and presses them against the side of the brake drums. When you release the pressure by letting up on the brake pedal, the s-cam moves back into its neutral positions, and springs pull the brake pads back together. This will allow the wheels to spin freely again.

NOTE: When driving apparatus, do not place your foot on the brake pedal unless you plan to brake the vehicle. Unnecessary application will cause excess wear on the brake shoes, drums and rotors. This also contributes to brake overheating that can cause complete brake failure.

AIR BRAKES OPERATIONS

AIR BRAKE STOPPING DISTANCES

When we talk about stopping distances, there is longer delay for air brakes. With air brakes it takes a little time, about half a second or more, for the air to flow through the lines to the brakes. Thus the total stopping distance for vehicles with air brake systems are made up of **FOUR DIFFERENT FACTORS:**

PERCEPTION DISTANCE

This is the distance your vehicle travels from the time your eyes see a hazard, until your brain recognizes it. The perception time of the average alert driver is about $\frac{3}{4}$ of a second. At 55 mph your vehicle will travel approximately 60 feet in $\frac{3}{4}$ of a second.

REACTION DISTANCE

The distance traveled from the time your brain tells your foot to move from the accelerator, until your foot is actually pushing on the brake pedal. The average alert driver has a reaction time of about $\frac{3}{4}$ of a second. This accounts for an additional 60 feet when traveling at 55 mph.

BRAKE LAG DISTANCE

When accounting for the actions of the air brake system, at 55 mph add an additional 32 feet.

EFFECTIVE BRAKING DISTANCE

The distance it takes to stop once the brakes have been applied. At 55 mph on dry pavement, with good brakes, it can take a heavy vehicle about 170 feet to stop. The time it takes is about $4\frac{1}{2}$ seconds.

STOPPING DISTANCE FORMULA

PERCEPTION DISTANCE	$\frac{3}{4}$ SEC	60 FEET
+REACTION DISTANCE	$\frac{3}{4}$ SEC	60 FEET
+BRAKE LAG DISTANCE	$\frac{1}{2}$ SEC	32 FEET
+EFFECTIVE BRAKING DISTANCE	$4\frac{1}{2}$ SEC	170 FEET
<hr/>		
TOTAL STOPPING DISTANCE	$6\frac{3}{4}$ SEC	322 FEET

STOPPING THE VEHICLE WITH AIR BRAKES

EFFECTS OF WEIGHT ON THE STOPPING DISTANCE

The heavier the weight, the more the brakes, shock absorbers, have to work to stop the vehicle. However, the vehicles brakes are designed to function best when the vehicle is heavy. An empty truck requires more stopping distance than a fully loaded one. Empty trucks have less traction, and they bounce, and wheels have a tendency to lock up. This giving the empty truck poor stopping distance.

SLIPPERY SURFACES

It will take longer to stop, and it will be harder to turn without skidding, when the road is slippery. You must drive slower to be able to stop in the same distances as when the road is dry. Wet roads can double stopping distances. Reduce your vehicles speed about on third, from 55 mph to 35 mph.

EMERGENCY STOPPING

You must brake so that you can steer the vehicle and so the vehicle remains in a straight line. There are two accepted methods;

CONTROLLED BRAKING

This method is also called squeeze braking. Put on the brakes as hard as you can, without locking up the wheels, be sure not to turn the steering wheel while performing this maneuver. If you need to make large steering adjustments, or if you feel the wheels sliding, release the brakes, steer to the correction, and reapply the brakes as soon as the brakes get traction on the wheels.

STAB BRAKING

- A. Press on the brake pedal as hard as you can.
- B. Release the brakes as soon as you hear them lock up.
- C. As soon as the wheels start rolling again reapply the brakes as hard as you can.

Make sure you allow time for the wheels to start rolling again. It can take up to one full second for the wheels to begin rolling once they have been locked up. Otherwise the vehicle will not stay in a straight line.

DRIVER OPERATOR

PRACTICAL ASSESSMENT

1.1 Preventive Maintenance;

Perform routine tests, inspections. And service functions on the systems and components.

- Battery (ies)
- Braking system
- Coolant system
- Electrical system
- Fuel
- Hydraulic fluids
- Oil
- Tire wear/air pressure
- Steering system
- Belts
- Tools, appliances and equipment in the interior and exterior of the apparatus

Requisite Knowledge: Manufacturers specifications and requirements, guidelines and Procedures of the department

Requisite Skills: The ability to use hand tools, recognize system problems and correct deficiencies per department guidelines

1.2 Backing Vehicle;

Back a vehicle from a roadway into restricted spaces on both the left and right sides of the vehicle, or will be known as the *alley dock*. The vehicle must be parked a certain distance from the dock (cone) within the restricted space without having to stop and pull forward and without striking obstructions (cones). The first practice run will have a spotter, the second run will not.

Requisite Knowledge: Vehicle dimensions, turning characteristics, spotter signaling, and principles of safe vehicle operation

Requisite Skills: The ability to use mirrors, judge vehicle clearance, and operate the vehicle safely

1.3 Obstructed Roadway;

Maneuver a vehicle around obstructions on a roadway while moving forward and in reverse. This will be known as the *Serpentine*. The vehicle is maneuvered through the obstructions without stopping to change the direction of travel and without striking any obstructions. The first run is with a spotter the second is without a spotter.

Requisite Knowledge: Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation.

Requisite Skills: The ability to use mirrors and judge vehicle clearances.

1.4 Turning a Vehicle in Limited Space:

Turn the fire department apparatus around within a confined space. This will be done in an area in which the vehicle cannot perform a U-Turn without stopping and backing up, so that the vehicle is turned 180 degrees without striking obstructions within the confined space.

Requisite Knowledge: Turning characteristics and vehicle dimensions

Requisite Skills: The ability to judge distance, vehicle clearance, and mirror use

1.5 Restricted Clearance:

Maneuver a vehicle in areas with restricted horizontal clearance (diminishing clearance). The vehicle must move through the area of restricted clearance at 25 mph so that the operator accurately judges the ability of the vehicle to pass through the openings and not hit any obstructions.

Requisite Knowledge: Turning characteristics and vehicle dimensions

Requisite Skills: The ability to judge distance, vehicle clearance, and mirror use

1.6 Emergency Stopping:

Operate the vehicle using defensive driving techniques to maintain control of the vehicle while performing an emergency deceleration.

Requisite Knowledge: The effects of vehicle control of liquid surge, braking reaction time, load factors, general steering reactions, speed and centrifugal force and principles of skid avoidance.

Requisite Skills: The ability to operate passenger restraint devices, maintain control of the vehicle while accelerating and decelerating, turning, coming to a complete stop from 55 mph without locking up the wheels and stopping within a prescribed area.

DRIVER OPERATOR**PRACTICAL ASSESSMENT SCORE SHEET**

STUDENT NAME: _____

DATE: _____

INSTRUCTOR: _____

Essential Pre-Trip Inspection (value 100 points)

- Driver checks fluids, engine, belts and tires prior to moving _____ (25)
- Driver does a 360 walk around checking for loose equipment _____ (25)
- Seatbelt use at all times _____ (25)
- Adjusts mirrors _____ (25)

Total _____

Serpentine (value 50 points)

- Pass cone on wrong side _____ (5)
- Each time vehicle stops to reposition _____ (5)
- Each cone hit _____ (5)

Total _____

Emergency Stopping (value 50 points)

- Smoothly accelerate to 55 mph _____ (15)
- Smooth deceleration to complete stop _____ (15)
- Fails to maintain driving position on course _____ (15)
- Each cone hit _____ (5)

Total _____

Diminishing Clearance (value 50 points)

- Each cone hit _____ (5)
- Each stop within cones _____ (5)
- Failure to apply brakes smoothly at finish cone _____ (50)
- Driver leans out of the window _____ (25)
- Hits the last cone _____ (50)

Total _____

Alley Dock Exercise (value 50 points)

- Each cone hit _____ (5)
- Distance from rear bumper to center cone in inches _____
 1. 0-6" 50 points
 2. 6-9" 45 points
 3. 9-12" 40 points
 4. 12-15" 35 points
 5. 15-18" 30 points
 6. > 18" 0 points

Total _____

Restricted Clearance (value 50 points)

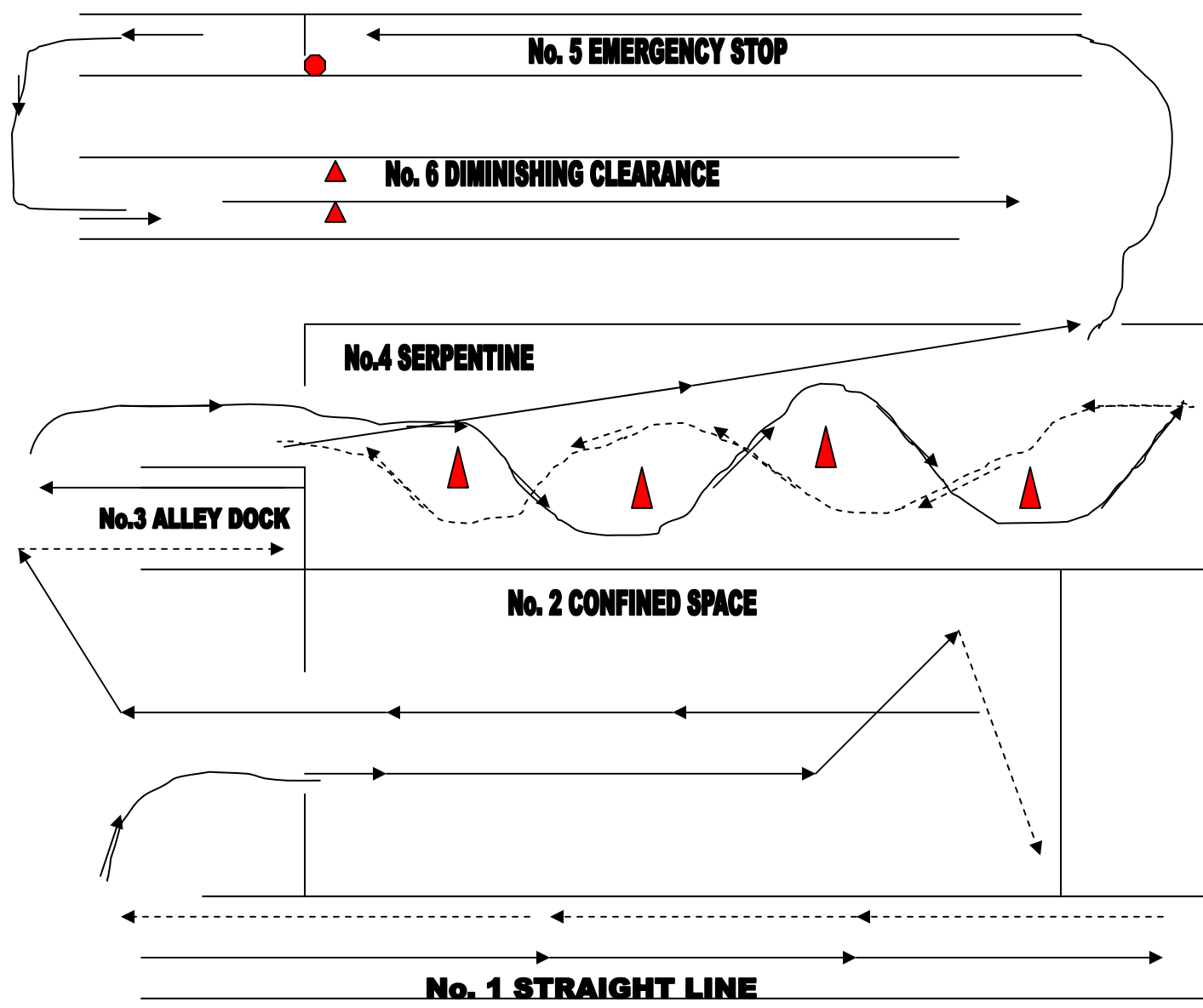
- Each cone hit _____ (5)
- Use more than 3 maneuvers _____ (25)

Total _____

STUDENTS CUMULATIVE SCORE _____

70 is passing

DRIVING COURSE MAP



MAP KEY

—————> FOWARD MOVEMENT

- - - - -> REVERSE MOVEMENT