Autonomous Commercial Motor Vehicles: Implementation of Rules and Regulations

Tim Burgess

Abstract

Ensuring the safe and efficient transportation of goods and services has long been the ultimate goal for commercial motor vehicle operators. As technology continues to evolve, the use of autonomous commercial motor vehicles will soon be contributing to this goal and will be traversing the roadways of the U.S. This research paper will explore current state laws, the possible liabilities, the associated costs, and the current operation of autonomous commercial motor vehicles. With all topics reviewed and discussed, to include a survey of members assigned to Florida Highway Patrol, Office of Commercial Vehicle Enforcement, there will be challenges ahead for those tasked with enforcing the rules and regulations governing autonomous commercial motor vehicles.

Introduction

The prospect of autonomous commercial motor vehicles (CMV) may still seem impossibly futuristic, due to advancements in technology and research have achieved a level which have brought this vision to reality.

This research paper will explore the current problems associated with the transportation industry, the developed timeline for possible implementation of fully autonomous vehicles, the liabilities associated with the use of autonomous technologies, the present and future costs of utilizing such technology, the current legislation that has been enacted at the state and federal level, and current autonomous technology currently employed by research and development firms and the associated transportation companies. With these substantive and perceived problems looming, it will be imperative that those regulatory bodies that enforce the rules contained in Code of Federal Regulations (CFR) be able to navigate current federal and state law to assist in providing a safe driving environment and take appropriate enforcement action as needed, regardless of the operator (computer or human) of the CMV.

Literature Review

Statement of Problem:

According to the US Department of Transportation (USDOT), Federal Motor Carrier Safety Administration (FMCSA), Office of Analysis, Research and Technology, in 2015 there were approximately 12.1 million registered commercial motor vehicles within the United States (US). These vehicles traveled approximately 236 billion miles, transporting freight and passengers and were operated by approximately 5.9 million

commercial driver's license holders, who were employed by 524,058 active motor carriers. (USDOT, FMCSA 2017)

This vast commercial transportation network also brings numerous challenges to combat the loss of life due to fatal traffic crashes involving commercial motor vehicles, lost freight, and overall loss of revenues. In 2015 there were a reported 3,838 fatal crashes that involved at least one truck or bus (11.9% of total) and an additional 476,000 reported non-fatal crashes (7.6% of total), 3,709 crashes involving a hazardous material release, and a loss of approximately 28 billion dollars due to property only damage crashes alone. (USDOT, FMCSA 2017)

These statistics led the US Center for Disease Control and Prevention (CDC) to claim the leading cause of death in the US to be motor vehicle crashes. The CDC has also reported the losses from medical care and productivity decrease to 75 billion dollars, due to vehicle crashes. (USDOT, NHTSA 2017)

Timeline:

The concept of autonomous vehicles dates to 1939, when General Motors unveiled their Futurama exhibit, in an attempt to forecast the transportation industry 20 years into the future. During this period, operations were based on radio-controlled technology. Over the coming 30 years little advancement was made, and allocated budgets to projects such as these dried up. In the 1970s the first autonomous vehicle was produced in Japan, which relied upon information from an elevated rail. Into the 1980s and 90s a project was completed in Germany, where a vehicle equipped with a computer system was able to navigate a 1,700-kilometer distance, reaching a maximum speed of 112 miles per hour. Moving into the 21st century, innovations evolved into military applications including, driverless vehicles and global positioning system guided missiles. Fast forward to today, the evolution of autonomous vehicles including commercial purposes, has been put into motion to improve safety and fiscal responsibility among carriers and their respective drivers. (Dang, n.d.)

In 2016, The Society of Automotive Engineers (SAE) defined the levels of automation (0 to 5), based upon the amount of interaction between the driver and the vehicle.

Level 0: No Automation, full-time driving task performed by human driver; includes the use or warnings and interventions.

Level 1: Driver Assistance, vehicle performs specific tasks under specific driver modes (i.e. parallel parking assistance).

Level 2: Partial Automation, same as level 1 allowing for multiple systems to perform specific tasks.

Level 3: Conditional Automation, automated driving system (ADS) can perform all driving tasks, but human driver will intervene when requested.

Level 4: High Automation, same as level 3, but would not require human driver intervention.

Level 5: full time driving function performed ADS; steering wheel optional.

(Bernard Bracy, et al, 2018)

The various levels benefit motor carriers and their drivers by combating fatigue, limiting the number of hours of service, decreasing driver's distraction and improving fuel mileage. These levels of automation also reduce the number of unsafe driving practices including speeding, following too closely, improper lane changes, and failing to yield. (Bernard Bracy, et al, 2018)

On May 28, 2019, the National Highway Traffic Safety Administration (NHTSA) and the FMCSA began the process of addressing rules and regulations that restrict the implementation and usage of autonomous commercial motor vehicles. FMCSA issued an advanced notice of proposed rule-making (ANPRM). The ANPRM would specifically address Level 4 and Level 5 automated vehicles, since Levels 1-3 would still require a driver. (Montague, 2019)

The ANPRM targeted input dealing with a multitude of issues, specifically with Federal Motor Vehicle Safety Standards (FMVSS) including: devices that require the driver to use effort and force (braking, manual shifting) (No. 105), operation of turn signal and hazards lamps (No. 108), activating the parking brake (No. 114), electronic stability control (ESC) systems (No. 126), braking that requires "by means of foot control" (No. 135), transmission and braking controls (No. 136), and operation of the vehicle on the Uniform Tire Quality Grade (UTOG) for testing (No. 138). (Montague, 2019)

Additionally, the ANPRM included the request for public feedback in order to ascertain how the FMCSA would amend and adopt certain Federal Motor Carrier Safety Regulations (FMCSR) for the safe operation of autonomous commercial motor vehicles. Particular topics open for input included: whether or not to restrict certain CMVs with certain cargo types from the use of autonomous technology; should the FMCSRs be written to include the requirement of human drivers; how would current commercial drivers license regulations be applied; how to enforce current hours of service requirements for drivers; how would regulations address distracted driving, i.e. the use of hand-held mobile telephones and texting while driving; when would drug and alcohol screening be required (pre-employment, post-crash); how would FMCSA arrange for the required maintenance and periodic inspection of such vehicles; and how would commercial carriers combat cyber security issues. (Montague, 2019)

Liabilities:

As autonomous CMVs evolve and become more accessible, liability concerns and issues are at the forefront. Stakeholders are optimistic that liability issues will not hinder the progression of technology and use of autonomous CMVs. (Villasenor, 2014)

Autonomous CMVs are inevitably going to be involved in vehicle crashes, creating issues of liability. Regulations and laws must be in place to protect all parties affected and to provide guidance in both criminal and civil cases. Areas that need to be addressed include: how to handle data post-crash; how manufacturers will take a "hard stance" and not allow proprietary data to be shared to assign causation; and determining whether the CMV human driver should have taken control over the vehicle due to known hazards and road conditions. (Villasenor, 2014)

Liability questions and legal theories involving strict liability, negligence, manufacturing defects, design defects, misrepresentation, and breach of warranty will be

fluid until autonomous vehicle technology has been well addressed in the courts. (Villasenor, 2014)

John Villasenor at Brookings Institution, published guiding principles that can help frame discussion going forward for federal, state and local governments; the legal community; research and development teams advancing such technology; and the end consumer:

1. Preemptively resolving liability issues should not be a precondition to the commercial rollout of autonomous vehicles.
2. Products liability law has proven to be remarkably adaptive to new technologies.
3. Congress should not preempt state tort remedies with respect to autonomous vehicle liability.
4. Manufacturers of non-autonomous vehicles should not be liable for alleged defects introduced through third party conversions into an autonomous vehicle.
5. Federal attention to safety standards for autonomous vehicles will be needed and those standards will have liability implications.
6. Liability related to commercial motor vehicles should be, at least in part, addressed at the federal level.

Associated Costs:

To gain a true understanding of the costs associated with the implementation of autonomous commercial motor vehicles, one must analyze the current costs of human driven CMVs. The cost savings cannot be fully realized until full implementation of autonomous vehicles into a commercial fleet. The following factors could be considered when a determination is made based on operating expenses.

Fuel is the largest operating expense (39% of total) incurred by commercial carriers. It is estimated that a commercial motor vehicle consumes 20,500 gallons of fuel in a year. According to the US Energy Information Administration, the average price for a gallon of diesel fuel was $3.056, which equates to a cost of $62,648. Some of these fuel costs may be offset with the operation of fully autonomous CMVs by 1) limiting the driver from continued acceleration and deacceleration, an improvement of four to ten percent efficiency; 2) reducing the overall distance traveled, which would be based solely on real time traffic conditions; 3) the use of platooning technology to allow for a decreased distance between vehicles, which would limit drag of CMVs and increase roadway capacity. (US EIA, 2020) (Truck Driving Institute, 2013)

The second largest operating expense for commercial carriers is driver salary (26% of total). There are approximately 1.8 million CMV drivers out of 5.9 million commercial drivers license holders in the US, who on average can expect to make $40,000 - $50,000 per year and could grow to the $70,000 range with safe driving experience. As the autonomous CMV sector continues to grow, some would argue that the employment of conventional drivers will decrease. However, a new job market will be created with new training and employment opportunities available with emphasis on previous driving experience and those in the information technology sector, resulting in higher base salaries. (Truck Driving Institute, 2013)

Conventional truck tractors can cost in excess of $100,000, depending on specifications and options. This cost distributed over the course of lease or bank financing can be attributed to 17% of yearly operating expenses. It is estimated it will cost $30,000 to retrofit these CMVs with autonomous technology. This initial advancement will primarily be used in platooning, with the goal of fully autonomous in the distant future. The return on this investment could be realized over a three-year period, with improved driver and vehicle efficiency. No research or studies have shown what the realized actual cost for a fully automated CMV will be. (Truck Driving Institute, 2013) (Kilcarr, 2015)

Adopted Laws and Regulations:

Currently nine states and the District of Columbia have enacted legislation that defines autonomous vehicle and the associated operation of such vehicles. Certain limitations and authority have been put in place to allow for the adoption of safety standards and performance which vary from state to state. A few irregularities exist and the current laws are as follows:

California – The Department of the California Highway Patrol is required to set and adopt safety standards and performance requirements for safe operation of autonomous vehicles. The Contra Costa Transportation Authority was also authorized to conduct a pilot project in specific locations (California Vehicle Code, Section 38750).

Connecticut – Definitions of fully autonomous vehicle, automated driving system and operator have been established. A pilot program involving four municipalities, where fully autonomous vehicles will be tested on public roads, has been established. Studies will also be conducted by a task force providing an evaluation of autonomous vehicles, which will lead to recommendations for the legislative process (Substitute Senate Bill No. 260, Public Act No. 17.69).

Florida – Legislative authority was granted to the Department of Highway Safety and Motor Vehicles (DHSMV), which defined automated driving system, contained in Florida State Statute (FSS) 316.003(3) to include the terms: autonomous vehicle, dynamic driving task, fully autonomous vehicle, and operational design domain. Also defined is driver-assistive truck platooning technology (FSS 316.003(21)), on-demand autonomous vehicle network (FSS 316.003(49) and teleoperation system (FSS 316.003(89)). Further laws allow the Department of Transportation, in consultation with DHSMV, to allow for and study the safe use of a truck platooning project. FSS 316.85 outlines the requirements for safe operation and obeyance of traffic laws. Other laws enacted have already been established to address the titling of autonomous vehicles (FSS 319.145) and the exemption of liability for manufacturers conducting conversions to automated operation (FSS 316.86).

Michigan – Current law allows for autonomous vehicles to operate under certain conditions and provides definitions of such vehicles. Another provision provided limits the liability of the manufacturer, which includes a third party who has modified vehicles to fully

autonomous, and exempts mechanics and repair shops. (Michigan Vehicle Code 257.665)

Nevada – In line with other states, Nevada has clearly defined fully autonomous vehicles, driver-assisted platooning technology, and automated driving system (Nevada Revised Statutes, Chapter 482A). However, though Nevada already restricts the use of a hand-held mobile phone while operating a vehicle, the state permits the use of such device when driving an autonomous vehicle as drivers are deemed not operating a vehicle. A fine structure has been implemented for violation of laws pertaining to autonomous vehicles, in which a fine of up to a $2,500 may be imposed.

Tennessee – The Automated Vehicles Act (Tennessee SB 151) was enacted to add and modify current legal definitions as they apply to the operation of motor vehicles, and now fully automated vehicles. This act included standards for crash reporting and legislated a criminal violation (misdemeanor) for operating a vehicle without a human driver in the driver's seat, unless meeting requirements of this act.

Fourteen additional states are continuing the process of enacting similar legislation to those that have been successful. (McChristian, 2016) (Davis, 2017)

Current Autonomous Commercial Motor Vehicle Operations:

Worldwide, numerous pilot projects are testing varying levels of autonomy to CMVs. These pilot projects are at various stages of research and development.

In 2015, Freightliner unveiled its first autonomous CMV in Nevada, named the Inspiration. This vehicle is operated by a proprietary system called Highway Pilot, which utilizes stereoscopic cameras that enter information into the truck's central processing unit (CPU), which ultimately controls steering and speed. This vehicle is still currently being tested and has logged over 100,000 miles. (Goodwin, 2015)

In 2016, Daimler Trucks tested three autonomous CMVs utilizing platooning technology on an open German road. This platooning technology allowed these vehicles to connect via Wi-Fi, which allowed for a 50-foot separation of vehicles while traveling at highway speeds. Significant data from this testing and research allowed the manufacturer to compute wind resistance and fuel consumption, with both found to have decreased. (Hirsh, 2016)

In 2016, Otto, a self-driving trucking company, a subsidiary of Uber, embarked on a route from Fort Collins, Co. to Colorado Springs, Co. delivering product for Budweiser. This venture was deemed the first revenue generating load transported by an autonomous CMV. During this endeavor, the driver was only required to maneuver the vehicle when entering and exiting the highway. (Reuters, 2016)

Other product options have been released into the market place that will allow non-autonomous OEM vehicles to be converted to SAE Level 3 vehicles, such as Mobileye. Mobileye was developed in 1999 and allowed for the installation of sensors and cameras to assist in the safe driving experience for passenger vehicles and CMVs alike. In 2016, Mobileye partnered with Delphi, in hopes of producing a fully autonomous system by 2019. This platform would allow for SAE Level 4 and 5 vehicle conversions. This technology would eventually be used on CMVs. (Boudette, 2016)

Methods

The purpose of this research was to identify whether members assigned to the Florida Highway Patrol (FHP), Office of Commercial Vehicle Enforcement (OCVE), will have the knowledge, skills, and ability to enforce CMV regulations as they relate to autonomous commercial motor vehicles once standards are implemented industry and nationwide.

Data was gathered through surveys given to FHP / OCVE members statewide. Survey questions were designed to determine years of service enforcing the rules and regulations applicable to CMVs and if members were aware of pending legislation that would possibly change their day-to-day enforcement activities. Questions also asked participants their knowledge of how regulations are adopted with the state and federal registers, how they learn, and if previous roll-outs of legislation were adequately explained allowing them the knowledge to fulfill their current job duties. Questions were also asked to determine if participants viewed autonomous CMVs as improving roadway safety.

The survey was distributed anonymously in hopes of gathering an abundance of responses. Conversely, lack of responses may be due to some not willing to respond and already have reached a forgone conclusion that change may not occur even as open and honest answers were given.

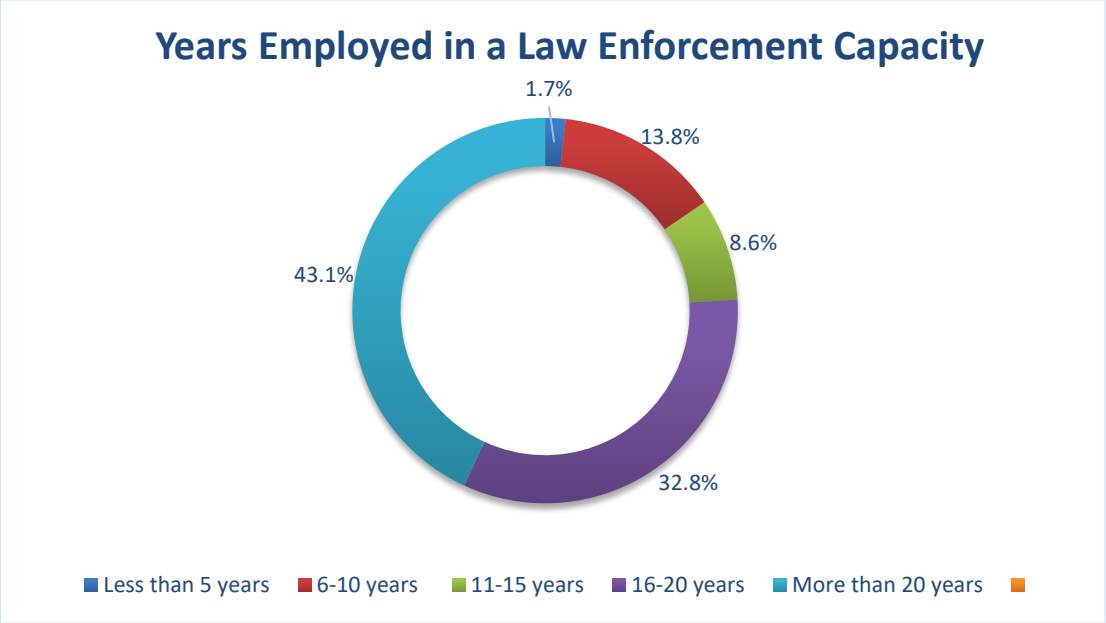
Results

The survey was sent to 264 sworn personnel assigned to the Florida Highway Patrol, Office of Commercial Vehicle Enforcement. I received 58 responses, for a response rate of 22%. Of those 58 responses, some respondents chose to skip some of the questions in the survey.

The first two questions on the survey were biographical in nature. Respondents were first asked how long they have been employed in a law enforcement capacity (federal, state, county, city).

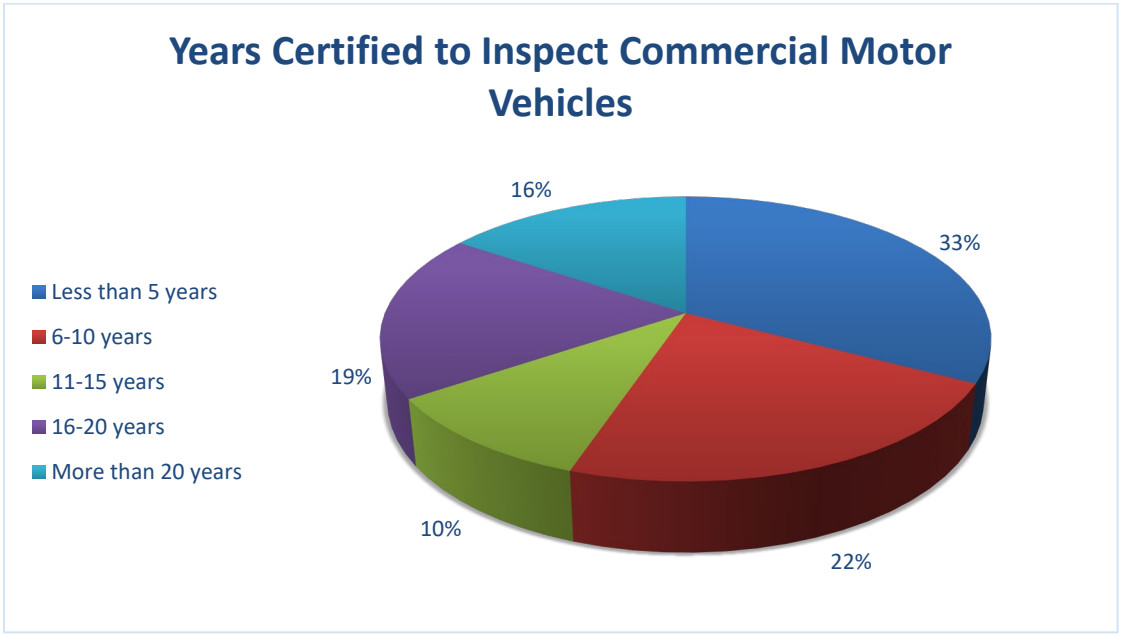
One of the 58 respondents (1.7%) reported less than five years; 8 respondents (13.8%) reported six to ten years; 5 respondents (8.6%) reported eleven to fifteen years; 19 respondents (32.8%) reported sixteen to twenty years; and 25 respondents (43.1%) reported more than twenty years.

TABLE 1: Years Employed in a Law Enforcement Capacity



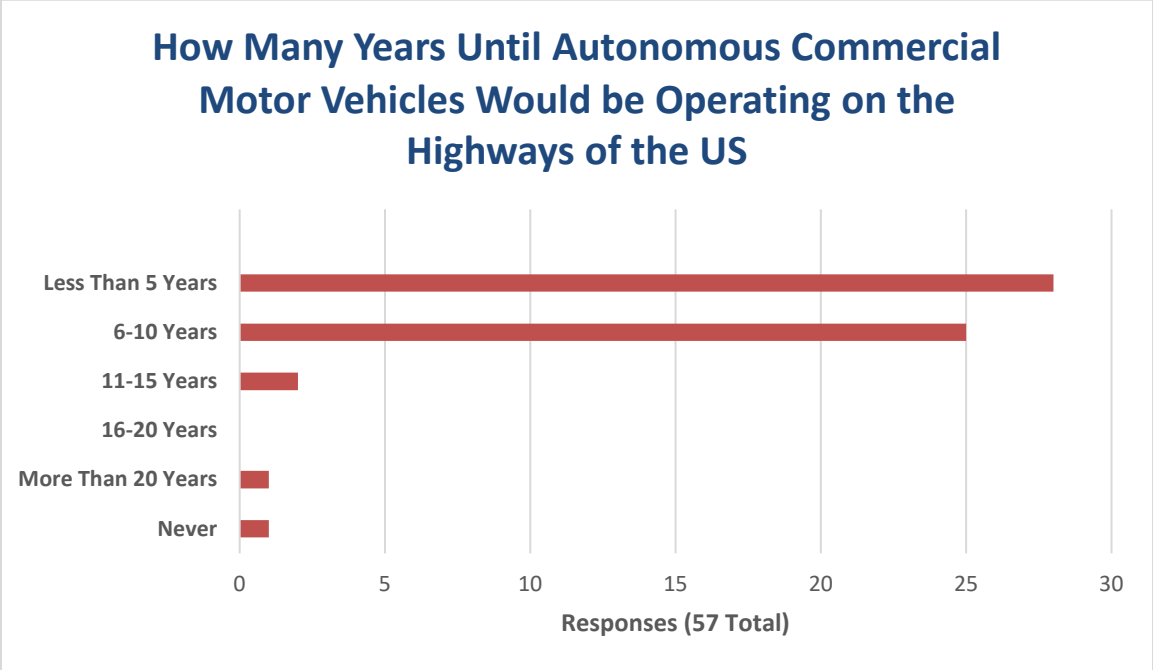
The second question asked participants to indicate their years of certification inspecting commercial motor vehicles. Nineteen of the 58 (32.8%) respondents reported less than five years; 13 respondents (22.4%) reported six to ten years; 6 respondents (10.3%) reported eleven to fifteen years; 11 respondents (19%) reported sixteen to twenty years; and 9 respondents (15.5%) more than twenty years.

TABLE 2: Years Certified to Inspect Commercial Motor Vehicles



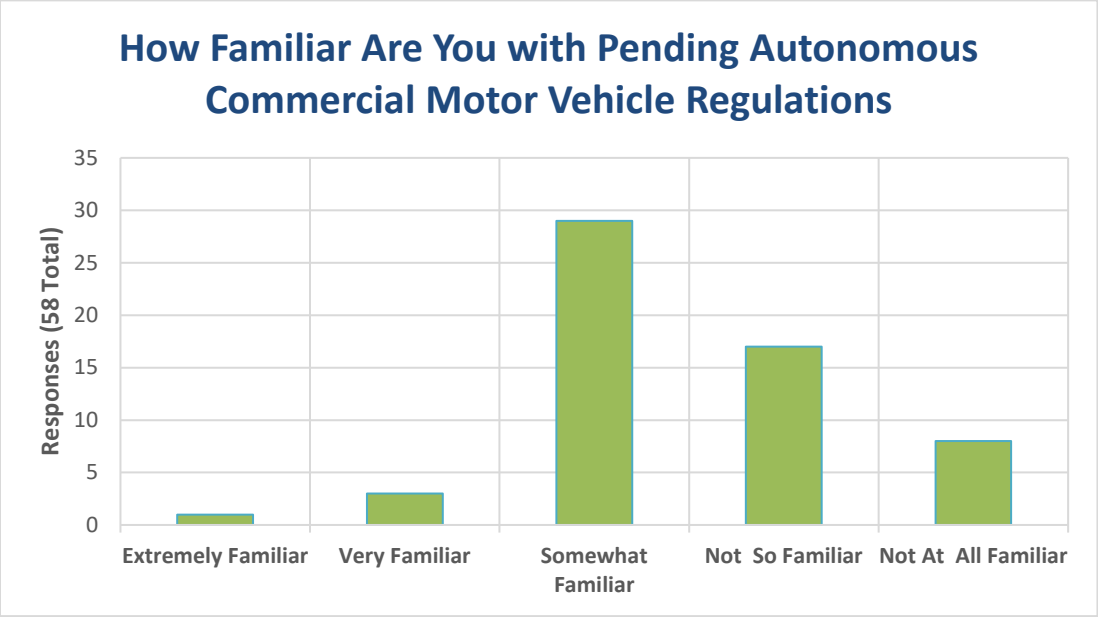
The third question looked at the number of years believed that autonomous commercial motor vehicles (fleet vehicles, excluding vehicles in research and development) would be operating on the highways of the U.S. One participant chose to skip this question. Twenty eight of the 57 (49%) respondents believed less than five years; 25 respondents (43.9%) believed six to ten years; 2 respondents (3.5%) believed eleven to fifteen years; 0 respondents believed sixteen to twenty years; 1 respondent (1.8%) believed more than twenty years; and 1 respondent (1.8%) believed never.

TABLE 3: How Many Years Until Autonomous Commercial Motor Vehicles Would be Operating on the Highways of the US



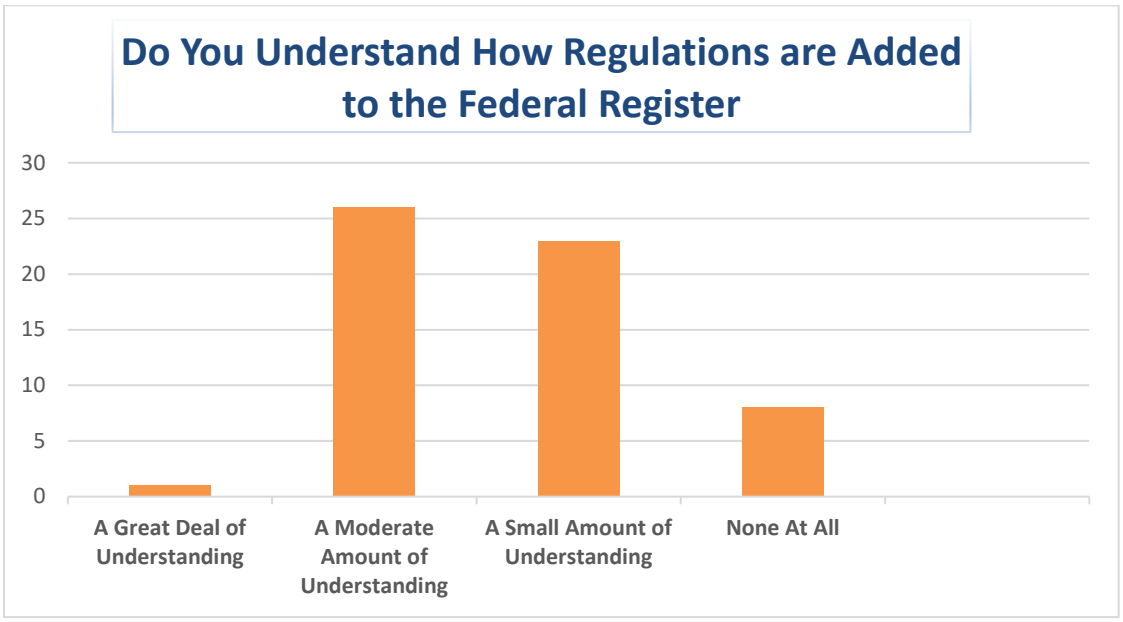
Question 4 asked respondents to identify how familiar they were with any current or pending legislation, either federal or state, governing the operation of autonomous commercial motor vehicles. Only one (1.7%) respondents was extremely familiar; three (5.2%) respondents were very familiar. The majority, twenty-nine (50%) respondents were somewhat familiar with pending legislation. Seventeen (29.3%) respondents were not so familiar; and eight (13.8%) respondents were not at all familiar.

TABLE 4: How Familiar Are You with Pending Autonomous Commercial Motor Vehicle Regulations



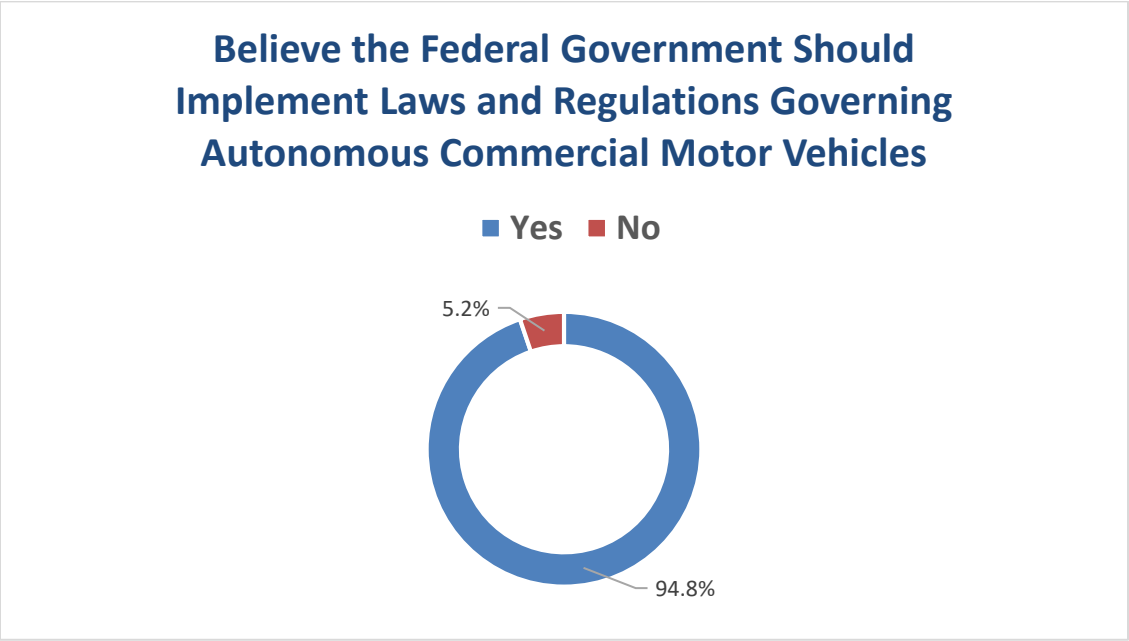
Question 5 inquired if participants understood how regulations are added to the federal register. Of the 58 responses, one (1.7%) respondent had a great deal of understanding, while most, twenty-six respondents (44.8%) and twenty-three respondents (39.7%) had a moderate amount or a small amount of understanding respectively. While eight (13.8%) respondents had no understanding of how regulations are added to the federal register.

TABLE 5: Do You Understand How Regulations are Added to the Federal Register



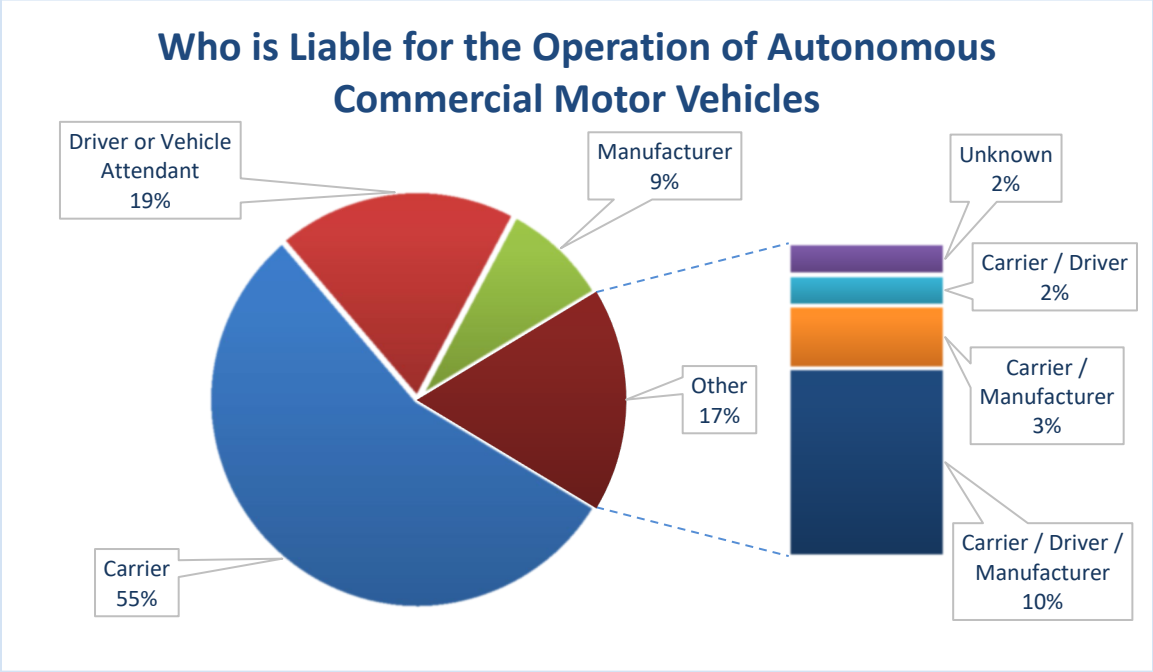
Question 6 asked whether participants believe if the federal government should implement laws and regulations governing autonomous commercial motor vehicles, instead of each individual state. Fifty-five (94.8%) of the 58 respondents answered yes, while three (5.2%) answered no.

TABLE 6: Belief the Federal Government Should Implement Laws and Regulations Governing Autonomous Commercial Motor Vehicles



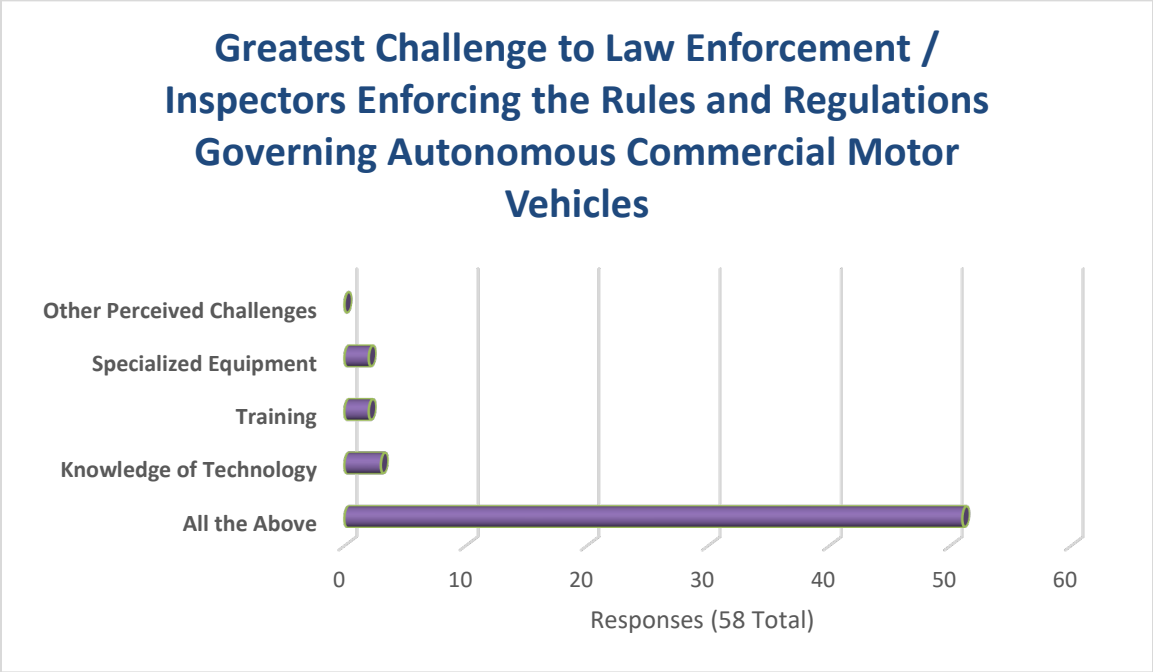
Question 7 was an opinionated question seeking a response as to whom would ultimately be liable for the operation of autonomous commercial motor vehicles. The majority thirty-two out of fifty-eight (55.2%) believed that the carrier would be liable; eleven respondents (19%) believed the driver or vehicle attendant would be liable; five respondents (8.6%) believed the manufacturer would be liable. A “other” response was also permitted for this question and provided additional options, in which eleven respondents (17.2%) answered with the following: unknown (1), carrier and driver (2), carrier and manufacturer (2) and carrier, driver, and manufacturer (6).

TABLE 7: Who is Liable for the Operation of Autonomous Commercial Motor Vehicles



Question 8 asked participants what the greatest challenge will be to law enforcement and / or inspectors enforcing the rules and regulations governing autonomous commercial motor vehicles. Fifty-one of the fifty-eight (88%) respondents believed knowledge of technology, training, and specialized equipment (all surveyed options) would be the greatest challenge. Two respondents (3.4%) believed training, two respondents (3.4%) believed the need for specialized equipment and three respondents (5.2%) believed knowledge of technology would be the greatest challenge to law enforcement and / or inspectors. An available response of “other perceived challenges” was made available with no responses recorded.

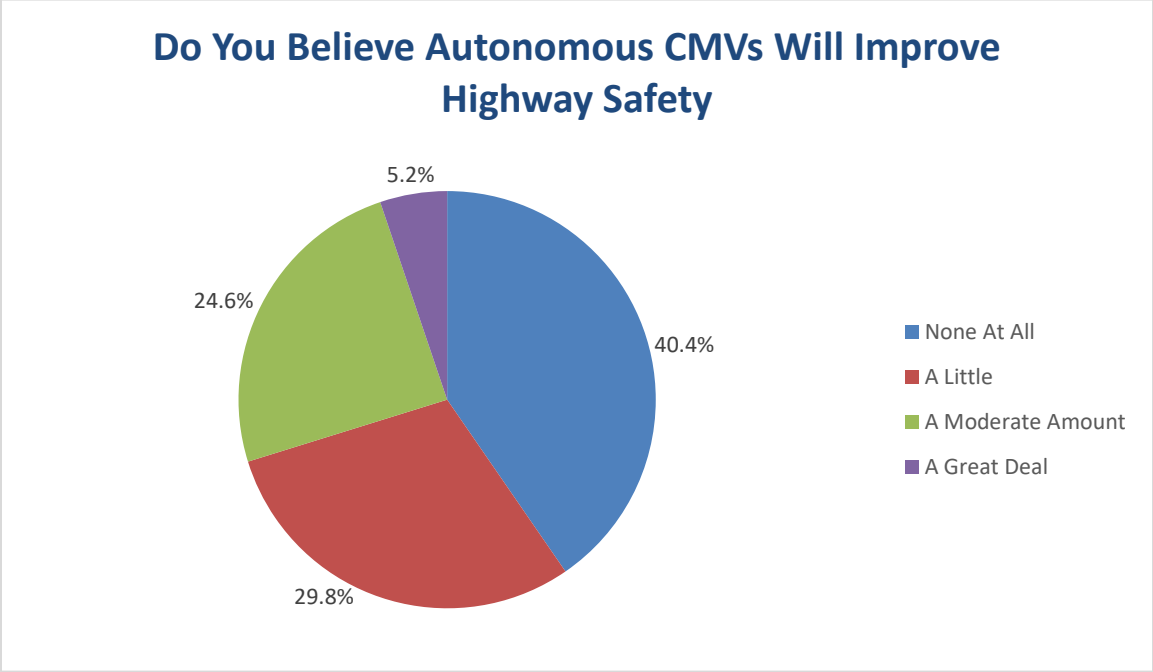
TABLE 8: Greatest Challenge to Law Enforcement / Inspectors Enforcing the Rules and Regulations Governing Autonomous Commercial Motor Vehicles



Recently, Florida adopted rules and regulations governing the use of electronic logging devices (ELD). Question 9 asked whether participants believed that they received adequate training to deal with this evolving technology. Thirty-five (61.4%) of the 57 respondents answered yes, while twenty-two (38.6%) answered no. One respondent chose not to answer. Although not requested, eighteen respondents used this question to provide additional input.

Question 10 asked participants if they believed that autonomous commercial motor vehicles would improve highway safety. The majority, 40 of the 57 respondents believed none at all (23 responses, 40.4%) and a little (17 responses, 29.8%). The seventeen remaining respondents answered a moderate amount (14 responses, 24.6%) and a great deal (3 responses, 5.2%). One respondent chose not to answer the question.

TABLE 10: Do You Believe Autonomous CMVs Will Improve Highway Safety



Discussion

Although only 58 of the 264 (22%) of those surveyed provided a response I believe this is a representative cross-section of the current sworn personnel assigned to the Office of Commercial Vehicle Enforcement within the Florida Highway Patrol. The results portray an interesting picture of the current workforce, their understanding of rules and regulations and some possible limitations placed upon them due to current operating procedure.

As operations of autonomous commercial motor vehicles moves closer towards implementation, FHP needs to examine the capabilities of the current workforce, as the majority (75.9%), is approaching retirement age. A new group of personnel will need to take on a new challenge of learning and interpreting new laws and enforcing a complex dynamic. One may assume that FHP's possible focus should be on the remaining 24.1% of the workforce that will have to tackle this new challenge.

Another key takeaway from the survey is the abundance of limited knowledge of current and pending legislation governing the operation of autonomous commercial motor vehicles, with 93.1% either somewhat familiar or not familiar at all categories. The learning curve needs to occur well before implementation, as the background knowledge should already be achieved. A similar issue also in need of further discussion is the lack of knowledge in how regulations are added to the federal register, as only 1.7% have a great deal of understanding of this process, while 53.5% have a small understanding to none at all. Improved understanding will facilitate the enforcement procedures, as legislation is generally phased in.

Lastly, 87.9% believed a combination of knowledge of technology, training, and the need for specialized equipment will be the greatest challenge to law enforcement / inspectors as the use of autonomous commercial motor vehicles is actualized. The training component could be compared to the recent implications of the use of electronic logging devices, another complex and time-consuming item to inspect, as 38.6% believed that adequate training was not received.

Recommendations

The Florida Highway Patrol, Office of Commercial Vehicle Enforcement needs to be on the "cutting-edge" of technologies and legislation introduced to allow for the safe and efficient transportation of goods and services statewide. There are multiple actions OCVE can take to accomplish this.

Review current processes transferring sworn personnel within the unit; years of service should not be the ultimate determining factor, but should include willingness to learn, ability to apply new concepts, and ultimately implementing a process to remove those who are not successful and/or able to fulfill job duties.

Ensure training is relevant, current, and meets the needs of those attending to include: annual or bi-annual schedule, testing of knowledge, skills and abilities, and invest in training aids for hands-on experience.

Lastly, continue to work with legislative bodies, both at state and federal levels, to ensure there is a clear delineation and standards addressing liability and enforcement issues, as those who perform the day-to-day task of enforcing rules and regulations will be at the forefront.

Implementing these recommendations will allow the Florida Highway Patrol to be at the forefront of enforcement efforts, with a workforce that is motivated and properly trained to take in this new challenging endeavor.

Lieutenant Tim Burgess has been in law enforcement for 20 years. He started his law enforcement career with the Florida Department of Transportation, Motor Carrier Compliance in 2001. In July of 2011, the Florida Department of Transportation was dissolved and shifted responsibilities to the Florida Highway Patrol, creating the Office of Commercial Vehicle Enforcement. Tim started as a patrol officer, assigned to Orlando Field Office, eventually transferring to the Tampa Field Office, where he promoted to Sergeant in 2007. In 2016, Tim was promoted to the rank of Lieutenant, where he remains in this capacity, overseeing operations of the Tampa District. He is a graduate of the Florida Leadership Academy, Class 15, and earned a Bachelor of Science degree in Business Management from the University of South Florida.

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Appendix A

Survey

Introduction

This survey is being administered to sworn members of the Florida Highway Patrol, Office of Commercial Vehicle Enforcement to determine the current knowledge base of autonomous commercial motor vehicles, the rules and regulations that apply to the operation of them and determine possible training needs once being operated on the roadways nationwide. This survey contains ten questions and should only take a moment of your time. The answers you provide will remain confidential.

Questions

How long have you been employed in a law enforcement capacity (federal, state, county, city)?

- Less than 5 years
- 6-10 years
- 11-15 years
- 16-20 years
- More than 20 years

How long have you been certified to inspect commercial motor vehicles?

- Less than 5 years
- 6-10 years
- 11-15 years
- 16-20 years
- More than 20 years

In how many years do you believe autonomous commercial vehicle (fleet vehicles, not in research and development) will be operating on the highways of the U.S.?

- Less than 5 years
- 6-10 years
- 11-15 years
- 16-20 years
- More than 30 years
- Never

Are you familiar with any current or pending legislation (federal or state) governing the operation of autonomous commercial motor vehicles?

- Extremely familiar
- Very familiar
- Somewhat familiar
- Not so familiar
- Not at all familiar

Do you have an understanding of how regulations are added to the federal register?

- A great deal of understanding
- A moderate amount of understanding
- A small amount of understanding
- None at all

Do you believe the federal government should implement laws and regulations governing autonomous commercial motor vehicles, instead of each individual state?

- Yes
- No

Who do you believe is ultimately liable for the operation of autonomous commercial motor vehicles?

- Manufacturer
- Carrier
- Driver or vehicle attendant
- Other (please specify)

What will be the greatest challenge to law enforcement and / or inspectors enforcing the rules and regulations governing autonomous commercial motor vehicles?

- Knowledge of technology
- Training
- Specialized equipment
- All the above
- Other perceived challenges (please specify)

Rules and regulations governing the use of electronic logging devices have been recently adopted by the State of Florida. Do you believe that you received adequate training to deal with this evolving technology?

- Yes
- No
- If No, what do you believe would be beneficial to assist in the training process?

Do you believe the use of autonomous commercial motor vehicles will improve highway safety?

- A great deal
- A moderate amount
- A little
- None at all