

4-1-2007

Entry-level heavy truck drivers and highway safety: Is it finally time for federally mandated training?

Harry L. Sink

North Carolina A & T State University

Follow this and additional works at: <https://digitalcommons.wayne.edu/jotm>



Part of the [Operations and Supply Chain Management Commons](#), and the [Transportation Commons](#)

Recommended Citation

Sink, Harry L. (2007). Entry-level heavy truck drivers and highway safety: Is it finally time for federally mandated training? *Journal of Transportation Management*, 18(1), 33-47. doi: 10.22237/jotm/1175385840

This Article is brought to you for free and open access by the Open Access Journals at DigitalCommons@WayneState. It has been accepted for inclusion in *Journal of Transportation Management* by an authorized editor of DigitalCommons@WayneState.

ENTRY-LEVEL HEAVY TRUCK DRIVERS AND HIGHWAY SAFETY: IS IT FINALLY TIME FOR FEDERALLY MANDATED TRAINING?

Harry L. Sink
North Carolina A & T State University

ABSTRACT

This article examines the need for mandated instruction and a uniform curriculum for entry-level commercial drivers. The study also addresses the discontinuity resulting from the establishment of a uniform licensing standard without requiring preparatory training. The research involves a review of Federal regulations pertaining to obligatory operator instruction in the air, water and rail mode. The investigation concludes that weak support and lobbying efforts by certain trucking interests have thwarted the adoption of mandatory instruction and/or a uniform curriculum. The study also highlights a pressing need for policy revision given the imminent retirement of many "baby boom" generation drivers.

INTRODUCTION

Trucks designated by the Federal Department of Transportation as large or heavy are involved in a disparate number of fatal highway accidents each year. These vehicles are manufactured with a gross weight rating of 10,000 pounds or more. During 2004 trucks of this type were involved in 416,000 accidents, 4,862 resulted in at least one fatality and a total of 5,190 people died. These accidents represented 12.0% of all traffic fatalities; however, large trucks accounted for only 3.4% of vehicles registered and 8.0% of total vehicle miles traveled during this year. In addition 116,000 people were injured and 324,000 of the crashes involved solely property damage (NHTSA, 2004). Drivers or occupants of the large trucks involved in these crashes sustained 15.0% of the deaths and 23.0% of the injuries. From 1994 to 2004, the number of

fatalities involving large trucks increased by 5.0 percent (FMCSA, 2006).

The National Transportation Safety Board (NTSB) is responsible for investigating accidents to determine probable cause. While much of its effort is devoted to air crashes, the agency has conducted a number of inquiries involving heavy truck accidents over many years. Mr. Jim Hall, a former Chairman of the NTSB, summarized results of the agency's large truck investigations in his remarks at a conference on highway accident litigation a few years ago. Mr. Hall advised attendees that ". . . we know that the vast majority of truck accidents, like other highway accidents, involve some form of human error. We also know that although truck equipment and maintenance shortcomings were discovered in many of our investigations, those problems were not usually the primary accident

cause. In all highway crashes, we have found that driver-related factors such as speeding, fatigue, the use of alcohol and other drugs, inattention, aggressive driving, and inadequate training were often contributory causes" (NTSB, 1998).

Commercial motor vehicles (CMV) constitute a subset of the large truck category established by the Federal Department of Transportation. These vehicles are defined as truck-trailer combinations or straight trucks with a gross vehicle weight rating of 26,001 pounds or more, or any size truck transporting a placardable quantity of hazardous materials. The Federal Motor Carrier Safety Administration (FMCSA) classifies drivers of these vehicles as commercial motor vehicle operators (CFR Title 49 Part 383.5). They are required by Federal and state law to be qualified whenever they operate a CMV on a public highway. An examination of minimum CMV operator qualification requirements appears below.

MINIMUM QUALIFICATION REQUIREMENTS FOR COMMERCIAL DRIVERS

The Federal government has established regulations regarding the qualification of a commercial motor vehicle/heavy truck driver. These regulations have been codified into law and appear as Part 391 of Title 49 of the Code of Federal Regulations. Most states have essentially adopted Title 49 verbatim as state law. A few states have slightly modified or supplemented Title 49 in the derivation of their own statutes regarding commercial motor vehicle drivers.

The rules found in Part 391 establish minimum qualification requirements that must be maintained by commercial motor vehicle operators and their employers. If a driver is self-employed as an owner-operator, he/she must comply with Part 391 requirements for drivers and employers. The regulations state that a driver must be qualified to operate a commercial

motor vehicle in interstate commerce and the specific requirements appear in Table 1.

Part 391 regulations also provide that a motor carrier cannot permit a driver to operate a CMV unless the driver can 1) determine whether the freight to be transported is properly loaded and distributed and 2) is familiar with the methods and procedures for securing cargo in a CMV. Further, the rules state that a driver cannot operate a CMV until he/she has completed an employment application as proscribed in Title 49 and advised the employing motor carrier of any moving violation convictions incurred during the previous twelve months. Finally, the employing motor carrier must investigate the driving history of each applicant for the previous three years by requesting a copy of the motor vehicle driving record from each state in which the driver held a license and by contacting previous trucking company employers. In essence, these additional requirements are also germane to the proper qualification of a commercial driver (CFR Title 49 Part 391 Subpart B).

TABLE 1 MINIMUM QUALIFICATION REQUIREMENTS FOR CMV DRIVERS

- Operator must be at least 21 years old
 - The ability to read, write & speak English well enough to work as a commercial driver
 - Be able to safely operate a commercial vehicle as a result of experience and/or training
 - Be physically qualified as documented with a valid DOT Medical Examiner's Certificate
 - Possess only one valid Commercial Driver's License
 - Furnish to the employing motor carrier a list of motor vehicle violations which the driver has been convicted in the last 12 months
 - Not be disqualified by license suspension/revocation or because of criminal/other offenses
 - Successfully complete a road test or provide a document acceptable in lieu of a road test
-

ESTABLISHING MINIMUM TRAINING FOR COMMERCIAL DRIVERS

In 1986 Congress passed the Commercial Motor Vehicle Safety Act (CMVSA) requiring the DOT Secretary to formulate regulations leading to the establishment of uniform standards for commercial driver's licenses (CDL). Once created, a CDI would be necessary for the operation of a commercial motor vehicle. The individual states were tasked with the testing and issuance of such licenses. However, the Federal standards subsequently developed did not specify or mandate any training regimen or curriculum. They merely suggested that candidates for a CDL should study such areas as vehicle inspection procedures, off-road vehicle operation and driving a large truck in traffic (U.S. Court of Appeals, 2005).

As a result of concern about the number and severity of heavy truck accidents, Congress, in 1991, instructed the Secretary of Transportation to determine whether a need existed for the establishment of entry-level training for commercial truck and bus drivers. The Federal Motor Carrier Safety Administration considers commercial drivers possessing less than two years experience to be entry-level operators. The DOT was ordered to submit a report to Congress by 1993 or explain why such training was not necessary. The Federal Highway Administration's Office of Motor Carriers, predecessor to today's Federal Motor Carrier Safety Administration, previously developed minimum standards for the training of tractor-trailer drivers. These standards were used as the basis for a uniform or "model curriculum" published in 1985. This "model curriculum" guide required at least 320 hours of instruction including 116 hours of "on-street time" as well as 92 + hours of "driving-range" time. A 1995 Highway Administration study stated the "model curriculum" was the starting point for commercial driver training and determined that only 8.1% of motor carriers and 18.5 percent of bus companies provided their entry-level drivers with adequate training (Public Citizen, 2005).

The FMCSA held a public hearing in 1996 investigating the need for mandatory training for entry-level truck and bus drivers but did not follow up on this meeting. For all intents and purposes, the agency allowed the issue to remain dormant until a consortium of private entities instituted litigation seeking an order forcing the FMCSA to issue a rule and fulfill Congress' mandate on this issue. As part of a settlement agreement, the agency agreed to issue a final rule on the matter by May 31, 2004 (Public Citizen, 2005).

In August 2003, the FMCSA published an advanced notice of proposed rulemaking dealing with mandatory commercial driver training. The proposed rule applied solely to entry-level drivers. The required training involved the following four areas 1) driver qualification requirements, 2) hours-of-service limitations, 3) driver wellness and 4) whistle blower protection. The agency anticipated the training would require 10.5 hours study time, none of which involved skill development behind the wheel. After obtaining comments and holding a public hearing, a final rule was announced in May 2004, to become effective on July 20, 2004. The agency proclaimed the issuance of this rule was in response to the 1991 government mandated study determining private-sector training of commercial drivers to be inadequate (U.S. Court of Appeals, 2005).

In 2004, a group of safety advocates and several industry associations filed petitions for review of the FMCSA's final rule on entry-level commercial driver training. Petitioners in this matter argued that the agency's training requirements were arbitrary and capricious and did not adequately address the problem nor materially enhance safety. The U.S. Court of Appeals hearing the case agreed with the petitioners and remanded the issue back to the FMCSA for further consideration. Specifically, the court said,

In short, the record in this case shows that the agency entirely failed to consider the important aspects of commercial motor vehicle training before it; it largely ignored the evidence...and abandoned the recommendations of the Model Curriculum without reasonable explanation; and it adopted a final rule whose terms have almost nothing to do with an "adequate" commercial motor vehicle training program. FMCSA simply disregarded the volume of evidence that extensive on-street training enhances commercial motor vehicle safety (U.S. Court of Appeals, 2005).

The only other current commercial driver-training requirement concerns the operation of longer combination vehicles (LCV). A LCV is defined by the DOT as a truck-tractor pulling two or more semi-trailers with a gross weight rating greater than 80,000 pounds over the interstate highway system. Drivers of these vehicles must complete a proscribed curriculum, at an institution approved by the Department of Education, that includes a mandated amount of classroom and behind-the-wheel training time. Minimum requirements are also specified for instructors at these facilities and students must pass a written knowledge test and over-the-road skills test before being allowed to solo operate a LCV (CFR Title 49 Part 380).

It is clear that courts in the United States do not believe the Federal agency responsible for motor carrier safety has acted in a proactive manner regarding adequate commercial driver training for entry-level drivers. The reason for such "neglect" may be related to the significant Congressional influence wielded by the trucking industry via such industry organizations as the American Trucking Association, the Truckload Carrier's Association and the National Private Truck Council. Such industry organizations routinely lobby members of Congress to impede regulations thought to be detrimental to their cause as well as promote legislation favorable to the trucking industry.

Currently the FMCSA is investigating a rulemaking initiative that would implement a mandatory commercial driver-training curriculum applicable to all entry-level drivers and the creation of a graduated commercial driver licensing system (Federal Register, 2004). The trucking industry will likely oppose these changes as they will increase training costs and result in reduced entry-level driver flexibility. An example of this opposition was recently published in a well-known industry trade journal. The authors, in a guest editorial, cautioned commercial trucking owners and managers by proclaiming that motor carriers must monitor the Federal Register and strongly oppose new minimum training-hour requirements and the concept of graduated licenses. The readers were also advised to monitor legislation at the state level (Barr and Gibbs, 2006).

Most transportation related accidents and fatalities occur in the motor carrier industry (U.S. Census Bureau, 2006). Thus, it is logical to conclude this mode would require the most rigorous training requirements. An examination of government mandated training, qualification and certification in other transportation modes provides insight into whether this reasoning is valid. A comparison of this nature is especially relevant given the paucity of mandatory training currently required of entry-level commercial motor carrier operators.

MANDATORY TRAINING REQUIREMENTS IN OTHER MODES

Certified Locomotive Engineer

The requirements for the qualification and certification of locomotive engineers are housed in Title 49 Part 240 of the Code of Federal Regulations (CFR). This part specifies the components of the locomotive engineer certification process, implementation of the certification process, administration of certification programs and dispute resolution procedures as well as numerous appendices. This section of the

regulations also provides the minimum Federal safety standards for the training, testing and certifying of individuals operating locomotives in the rail industry. Training and safety regulations in the rail mode are promulgated and administered by the Federal Railroad Administration (FRA), a sister agency of the FMCSA. Both agencies are part of the Federal Department of Transportation.

Railroads are required to maintain a FRA approved initial/continuing training program for all Certified Locomotive Engineers. Initial training may be provided by the railroad itself or an approved external entity. However, the employing railroad is responsible for insuring all externally provided training meets the terms and conditions of the training and testing regimen accepted by the FRA. The curriculum for the initial training of student engineers includes the following: classroom exercises, skill performance, and familiarization with the physical characteristics of a locomotive and a train of cars. Training must be provided by a qualified instructor engineer, i.e., a Certified Locomotive Engineer with a comprehensive knowledge of the employing carrier's territory of operation, and include study areas pertaining to personal safety, railroad operating rules, mechanical condition of equipment, train handling procedures (including use of locomotive and train brake systems), and compliance with Federal regulations (CFR Title 49 Part 240.123).

The regulations require that locomotive skill training be conducted with a qualified instructor engineer located in the same compartment as the student whenever possible. The Federal training rules also require student engineers to operate the controls of a locomotive for a significant portion of time with a variety of trains. This is done to replicate the conditions normally incurred by the railroad likely to employ the student engineer (CFR Title 49 Part 240.123 Subpart 5).

Federal regulations also specify criteria for testing knowledge and examining skill performance of student engineers. Each

railroad's FRA approved training program must include procedures to examine a student's knowledge and skills to insure compliance with the railroad's operating rules and safe operation of trains. The program must be (a) objective in format, (b) administered in written form, (c) test personal safety practices, operating principles, equipment inspection, train handling skill within the physical characteristics of the territory, and compliance with Federal safety regulations. The skill examination process must occur in the most demanding class of service the person will be subjected to by the employing railroad (CFR Title 49 Part 240.127). No individual will receive classification as a Certified Locomotive Engineer until they complete the FRA approved training program and successfully pass the examination.

Railroads are also required by FRA regulations to monitor the ongoing conduct of their Certified Locomotive Engineers by operational observations and via unannounced operating rules compliance tests. Certified engineers are required to undergo at least one unannounced compliance test each calendar year (CFR Title 49 Part 240.303). The Federal rail safety rules also address prohibited conduct by Certified Locomotive Engineers. Prohibitions include operating a locomotive/train past a signal indication, exceeding the maximum authorized speed limit by at least ten miles-per-hour, and failure to utilize safe braking practices. Other prohibitions involve occupying a main track segment without proper authority, tampering with safety devices installed in the locomotive, or failure to take appropriate safety precautions when serving as a designated Supervisor of Locomotive Engineers, a Certified Locomotive Engineer or an Instructor Engineer (CFR Title 49 Part 240.305).

Civil penalties are specified in Appendix A of the Federal safety regulations applying to the rail mode. An abundance of fines relating to every conceivable regulatory part and subpart addressing required training, testing and documentation is included. For example, a fine of \$2,500 for each violation, and a penalty of \$5,000 for each willful violation, is applied to the

following offenses: failure to adequately train new engineers, failure to have an adequate "required knowledge" testing procedure, failure to have adequate procedures for evaluating and documenting skill performance and failure to have adequate procedures for continuing education and the monitoring of ongoing performance (CFR Title 49 Part 240 Appendix A).

Appendix E to the Federal regulations delineates the procedure to be used in the conduct of a locomotive/train skills test. Among other requirements, each railroad must maintain adequate operating, safety and train handling rules. These rules must include preferred operating ranges for the throttle, brakes and overall speed. These ranges constitute benchmarks to be used by examiners and reviewing bodies. A test of a locomotive engineer's skill is required to evaluate compliance with Federal regulations, pre-departure inspections, proper use of the horn, whistle and headlight, safe coupling techniques, proper control to minimize train slack and buff forces, safe use of braking systems, compliance with signal and speed restrictions and use of the locomotive hand brake (CFR Title 49 Part 240 Appendix E). Succinctly stated, the FRA regulations delineate the training, testing and compliance required to obtain and maintain qualification as a locomotive engineer. The rules also include voluminous penalties for non-compliance.

Master Maritime Rating

The required training, testing and licensing of maritime personnel, e.g., deck officers, engineers, pilot officers, radio operators, etc., is found in the Title 49, Part 10 of the Code of Federal Regulations. These rules are in accordance with the provisions of the 1978 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), as amended in 1995. The International Maritime Organization, an agency of the United Nations, developed the STCW. The United States is signatory to the STCW and

agrees with STCW's goals of reducing human error and accidents by developing practical training standards for mariners. The U.S. Coast Guard is responsible for implementing the regulations found in CFR Title 49 Part 10.

Candidates for licensing in the maritime industry must possess minimum qualifications relating to age, experience, character references/recommendations, physical health, tests for dangerous drugs, citizenship, approved training, successful completion of professional examinations and, where designated, a practical demonstration of skills (CFR Title 49 Part 10.201). The U.S. Coast Guard Officer in Charge, Marine Inspection, administers licensing at seventeen port cities across the United States.

One classification in the U.S. maritime industry is that of Master. The individual holding this license is qualified to serve as the officer in command of a vessel. The Master of a water vessel is analogous to a Certified Locomotive Engineer or a large truck operator possessing a CDL. The licensing of all U.S. maritime personnel is predicated on a minimum amount of documented sea service, professional examinations and/or completion of Coast Guard approved coursework (CFR Title 49 Parts 10.211, 10.217, and 10.311).

An example of the service requirements for a Master rating, in ocean or near coastal trades for a vessel of any tonnage, is one year service as chief mate on an ocean steam or motor vessel subject to a minimum of six months of service as chief mate, and, service as an officer in charge of a navigational watch. To attain the rating of chief mate one must serve as an officer in charge of a navigational watch for a period of twelve months while licensed as a second mate. To obtain a rating of second mate one must hold a rating of third mate and serve for twelve months as an officer in charge of a navigational watch while holding a rating of third mate. Another option allows a third mate to complete twelve months of service, with a least six months as officer in charge of a deck watch, in combination with six months service as a boatswain, able

seaman, or quartermaster while holding a certificate as an able seaman (CFR 49 Parts 10.404, 10.405 and 10.406).

To attain a rating of third mate one must possess three years of service in the deck department of an ocean going vessel with at least six months of this service as an able seaman, boatswain or quartermaster, while holding an able seaman certificate. A third mate rating may also be obtained by graduating from the U.S. Merchant Marine Academy, the U.S. Coast Guard Academy, the U.S. Naval Academy, the deck class of a maritime academy approved by the U.S. Coast Guard Maritime Administrator, three years as an apprentice mate in a training program approved by the U.S. Coast Guard Commandant or graduation from the deck class of the Great Lakes Maritime Academy (CFR Title 49 Part 10.407).

The examination topics for those applying for a license as a Master vary in accordance with the route selected. However, typical areas include navigation and position determination, celestial observations, times of celestial phenomena, watch keeping (including navigation safety regulations), radar equipment, compass, tides and tidal currents. Other subjects include ship maneuvering and handling, ship stability, cargo handling and stowage, international maritime law, shipboard management, ship's business, communications, and search/rescue. Examination areas for lesser grades such chief mate, second mate, etc., involve prerequisite topics such as fire prevention and firefighting appliances, emergency procedures, medical care, and lifesaving. Since maritime licensing is progressive, examinations for higher-grade classifications require successful completion of lesser grade examinations and minimum periods of service as referenced above. Mariners desiring service in international trades are required to obtain a STCW certificate in addition to U.S. Coast Guard licensing (CFR Title 49 Part 10.910).

Every individual desiring employment on a U.S. flag vessel of at least 100 gross regulatory tons

(GRT) must initially obtain a Merchant Marine Document ("Z Card"). A "Z" card permits a seaman to work only on U.S. inland waters. To serve on vessels of at least 200 GRT aboard a U.S. flag vessel serving international trades, an untrained person must obtain a STCW-95 Certificate in addition to a "Z Card." To obtain a STCW-95 Certificate a new mariner must meet the following conditions: complete a U.S. Coast Guard (USCG) approved training program, possess seagoing experience of at least one year (said experience must include onboard training documented in a USCG approved training record book), or otherwise possess approved seagoing experience of at least three years. An additional condition requires bridge-watching service under the direct supervision of the Master, Chief Mate, or a Navigator for a period of at least six months while attaining experience at sea (STCW 1995). The Merchant Marine Licensing and Documentation Program administers Coast Guard licensing. All STCW-95 training programs are required by the International Maritime Organization to be monitored by a quality standards system that parallels ISO 9000 guidelines.

The USCG approved training program that a new mariner must successfully complete, for service aboard vessels of at least 200 GRT, entails the following study areas: Automatic Radar Plotting Aid (if the ship the mate will serve on is fitted with an Automatic Radar Plotting Aid), the Global Maritime Distress and Safety System (GMDS), basic training including personal survival techniques, personal safety and social responsibility, elementary first aid, fire prevention and firefighting. Additional training may be required depending on employer need such as proficiency in survival craft and rescue boats, medical first aid, and medical care (USCG, 2006).

Mandatory on-board training for new mariners varies depending on vessel type and service area. For example, to serve as an Able Seaman-Unlimited one must possess a minimum of three years service on deck on vessels operating on the oceans or the Great Lakes. Service as an Able

Seaman-Limited, requires that one possess eighteen months experience on deck in vessels of at least 100 GRT in waters not exclusively confined to rivers and small inland lakes of the U.S. To qualify as an Able Seaman-Special, a mariner must possess at least twelve months on deck service on vessels operating on the oceans or navigable waters of the U.S., including the Great Lakes (USCG, 2006).

To obtain a STCW-95 certificate a new mariner must complete additional U.S. Coast Guard approved training. This training includes Bridge Resource Management (for those desiring to work on deck), Radar and GMDSS Certificates (for deck officers serving on vessels equipped with ARPA/GMDSS), FCC License for GMDSS (for deck officers) and proof of proficiency in the use of survival craft. STCW-95 Certificate testing requires an applicant to demonstrate expertise in the required training areas, not merely pass written examinations. The STCW-95 certificate is the only document recognized by foreign governments (USCG, 2006).

Commercial Aviation Pilot

Pilot training requirements, examination and certification are the responsibility of the Federal Aviation Administration (FAA). The pertinent regulations are found at CFR Title 14 Parts 61 and 141. While there are numerous classifications of certified pilots in the U. S., only two types permit a pilot to transport people on a for-hire basis, i.e., Commercial Pilot and Airline Transport. The regulations specify certification by aircraft type and class. Large aircraft (those exceeding 12,500 pounds gross weight) or those equipped with one or more jet engines, e.g., a Boeing 747, require a pilot to hold a "type" rating. FAA issued Commercial Pilot and Airline Transport certifications do not expire but require

pilots to remain "current" with a minimum amount of relevant flight experience and undergo a flight review with an instructor every two years. Commercial and Airline Transport pilots are also required to pass a medical examination at varying intervals depending on age and appropriate flight privileges.

The provisions under CFR Title 14 Part 61 permit any flight school to train student pilots as long as the CFR requirements are met, whereas, Part 141 schools must meet certain FAA requirements to operate. For example, Part 141 flight schools must maintain minimum levels of personnel, aircraft and facilities, utilize a detailed course syllabus, and maintain a high student pass ratio. In essence, Part 141 schools are more structured and less flexible than programs offered under Part 61 regulations. Students may complete certificates and obtain ratings in less time and with fewer hours under Part 141. As a case in point, Commercial Pilot certification requires 190 hours of flight time under Part 141 whereas 250 hours are mandated in Part 61.

Appendix D of CFR Title 14 Part 141 sets forth the minimum training requirements relating to Commercial Pilot certification. To be eligible for enrollment in a Part 141 Commercial Pilot Certification course a person must at least hold a Private Pilot Certificate and appropriate instrument rating or be concurrently enrolled in an instrument rating course and pass an instrument rating practical test before completing the Commercial Pilot certification course. The Commercial Pilot certification course must include a minimum of 35 hours of ground training appropriate to the airplane category and class rating desired by the student. This training must encompass the aeronautical knowledge areas appearing in Table 2.

TABLE 2
MANDATORY GROUND TRAINING: COMMERCIAL PILOTS

FAA Regulations	Safe/Efficient Aircraft Operations	Chart and Compass Usage	Emergency Maneuvers/Procedure
NTSB Accident Reporting	Weight & Balance	Air Navigation Facility Usage	Night & High Altitude
Basic Aerodynamics	Aircraft Performance Chart Utilization	Aeronautical Decision Making	National Airspace System Procedures
Meteorology & use of Weather Reports	Exceeding Aircraft Performance Limitations	Principles & Functions of Aircraft Systems	

Mandatory in-flight training is also required under Part 141 regulations pertaining to a Commercial Pilot certification course. This training must be in areas appropriate to the aircraft category and class rating to which the course is designed. For example, an airplane requires a minimum of 190 hours. The in-flight training for an airplane multiengine course requires at least 55 hours of instruction, on the topics appearing in Table 3, and be received from a Certified Flight Instructor (CFR Title 14 Part 141 Appendix D).

Under CFR 14 Part 61.129 aeronautical experience for an airplane multiengine rating requires that a person seeking certification must log at least 250 hours of flight time including:

- 100 hours in a powered aircraft
- 100 hours of pilot-in-command time
- 50 hours in cross-country flight
- 20 hours flight proficiency training that involves the following:
 - 10 hours of instrument training (5 hours must be in a multiengine airplane)
 - 10 hours in a multiengine plane with a retractable landing gear, flaps, turbine power
 - A cross-country flight of at least 2 hours in a multiengine plane under daylight VFR conditions of more than 100 nautical miles in length

- A cross-country flight of at least 2 hours in a multiengine plane under night VFR conditions of more than 100 nautical miles in length
- 3 hours in a multiengine airplane within 60 days of taking the practical test
- 10 hours of solo flight time in a multiengine plane or 10 hours of flight time performing the duties of pilot in command with an authorized instructor that includes at least one of the following:
 - 1 cross-country flight of at least 300 nautical miles with landings at a minimum of 3 points, one of which is a straight-line distance of 250 nautical miles
 - 5 hours under night VFR conditions with 10 takeoffs and 10 landings with each of the landings involving a flight pattern at an airport with an operating control tower

In-flight training under Part 141 must be appropriate to the aircraft category and class rating and include approved subject material. The FAA multiengine airplane curriculum specifies the following mandatory knowledge areas: 1) pre-flight preparation, 2) preflight procedures, 3) airport base operations, 4) takeoffs, landings and go-arounds, 5) performance maneuvers, 6), navigation, 7) slow flight and stalls, 8) emergency operations, 9) multiengine

TABLE 3
MANDATORY MULTI-ENGINE IN-FLIGHT TRAINING: COMMERCIAL PILOTS

5 Hours of Multiengine Aircraft Instrument Training	One Cross-Country Flight of at Least 2 Hours Duration, Occurring in Night VFR Conditions
10 Hours with a Retractable Landing Gear, Flaps & Controllable Pitch Prop or Turbine Power	3 Hours in a Multiengine Aircraft at Least 60 Days Preceding the Practical Test
One Cross-Country Flight of at Least 2 Hours Duration, Occurring in Daylight VFR Conditions	

operations, 10) high-altitude operations and 11) post-flight procedures (CFR Title 14 Part 141 Appendix D).

The FAA regulations for a Commercial Pilot certification course under Part 141 also require solo flight training. For a multiengine airplane 10 hours are required, with the pilot seeking certification performing the duties of the pilot-in-command while under the supervision of a Certified Flight Instructor. The 10 hours must include at least one cross-country flight with landings at a minimum of 3 points and one segment of the flight involving a minimum straight-line distance of 150 nautical miles. The solo training must also include 5 hours in night VFR conditions with 10 landings. These landings must involve a flight with a traffic pattern at an airport with an operating control tower (CFR Title 14 Part 141 Appendix D).

TRAINING, OPERATOR COMPETENCE AND SAFETY

As chronicled above, the Federal agencies responsible for safety in the rail, maritime and air modes require extensive mandatory training for those seeking to operate vehicles in commerce. This training must comply with uniform standards and include an approved curriculum. The coursework must involve classroom study and a proscribed amount of time at the vehicle's controls, exposed to varying operating conditions, under the tutelage of a qualified instructor.

Proper training appears to impact safety in the trucking industry. A 2000 study noted that drivers obtaining instruction at formal training schools with established curriculums were less likely to receive citations for moving violations than drivers trained exclusively on-the-job (Monaco and Williams, 2000). In a 2003 report investigating driver management practices among some of the nation's safest motor carriers, the findings revealed an emphasis on pre-service and in-service training for company drivers and owner operators (Mejza et al., 2003).

The 2003 research involved a survey of motor carriers with exemplary safety records, as measured by compliance with Federal, state and local safety regulations, crash (accident) statistics and the recommendations of FMCSA Safety Directors. A high percentage of motor carriers included in the study required their newly hired drivers to undergo pre-service and in-service training before solo vehicle operation. This mandatory training most often included the following subject matter: defensive driving techniques, Federal safety regulations, pre-trip and post-trip vehicle inspections, and accident notification. These safety conscious carriers were also noted to use vehicle-based (on-road and off-road) and classroom based (oral and written) examinations to evaluate the effectiveness of their mandated training. The motor carriers requiring formal training clearly perceived benefits exceeding the cost of such training. The safety performance of these carriers also revealed fewer accidents and injuries/deaths.

Given the benefits resulting from structured training in the motor carrier industry, it may be time to revisit the mandatory adoption of a "model curriculum," especially for entry-level heavy truck drivers.

A MODEL CURRICULUM AND THE PROFESSIONAL TRUCK DRIVER INSTITUTE

A model curriculum developed by the FMCSA in the early 1980's was adopted in its entirety by a motor carrier industry group, The Professional Truck Driver Institute (PTDI), for use in certifying the programs of truck driver training schools. The model curriculum specifies core training requirements and study materials. It also addresses the appropriate type of vehicles, facilities, instructor hiring practices, graduation requirements and student placement practices to be utilized. The model curriculum was needed since the Commercial Motor Vehicle Safety Act did not contain any prerequisite training to obtain a CDL. However, provisions of the curriculum were never made mandatory by law and, thus, are still voluntary today. This condition continues despite an admission by the FMCSA that

...the "model curriculum" represents the basis for training adequacy and...(the) knowledge (required) to pass the CDL test is not sufficient to determine training adequacy (Federal Register, 2003).

Further insight into the FMCSA's position concerning mandatory training can be obtained from a recent report detailing public comments on the agency's newly proposed Minimum-Training Requirements for Entry-Level Commercial Motor Vehicle Operators. One question published in the FMCSA advanced notice of proposed rulemaking addressed the following question: "Should the training requirements for entry-level commercial motor vehicle drivers be mandated by the Federal government?" After synthesizing input from 151 responders, the agency concluded that training should be mandatory for all entry-level (CMV) drivers,

irrespective of the kind of vehicle they drive or the size of the employing carrier (Federal Register, 2003).

As noted above, the PTDI has incorporated this model curriculum into its "Curriculum Standard Guidelines for Entry-Level Tractor-Trailer Courses." These guidelines are used by the PTDI to certify truck driver training programs offered by private and publicly funded schools in the United States. This document states that "... it is the product of the collective wisdom of 250 motor carriers' safety personnel, drivers and educators teaching in the field of tractor-trailer operating, curriculum and safety...and represents the touchstones that a tractor-trailer driver training course should contain, and against which any such course may be judged" (PTDI, 1999).

The PTDI curriculum specifies the minimum amount of training and time necessary to become a "second seat" driver. Such a driver is considered to possess the skills to operate a commercial vehicle safely, but without supervision, lacks the experience to perform as a solo driver. Further, the PTDI curriculum publication declares that fully trained "solo-ready" drivers must undergo additional training provided by a considerably expanded curriculum. Such enhanced training must include additional road experience and supplemental vocational instruction under the guidance and supervision of an experienced, professional driver (PTDI, 1999).

A minimum of 148 training hours is specified by the PTDI curriculum including at least 44 hours behind-the-wheel time by the student. However, the guidelines allow up to 14 of the 44 hours behind-the-wheel time to be provided via an externship option. In essence, a qualified driver-trainer of the trucking firm intending to employ the student may provide this training. The guidelines also specify that 12 of the 44 mandatory driving hours must be spent on the street/road and 12 hours on a driving range (an off-road private training area). The remaining 20 driving hours may be split between the driving

range and road training. A minimum of 2 hours of driving range time and 1 hour of road time is recommended at night in areas without illumination (PTDI, 1999).

Five units of classroom/lab instruction are also required by the PTDI curriculum. These five units incorporate the remaining 104 hours of mandatory training as summarized in Table 4.

SUMMARY AND CONCLUSIONS

It is apparent the Federal government long ago recognized the need for mandatory operator training, in accordance with a uniform curriculum based on proven safety principles for the rail, maritime and air modes. The agencies charged with safety oversight in these modes established mandatory areas of study and training requirements for the licensing (certification) of water vessel, aircraft and locomotive operators. Statutory law formalized these training requirements.

The Federal agency responsible for safety in the trucking industry (FMCSA) has also repeatedly acknowledged the need for a unified training curriculum and standards for entry-level heavy truck drivers. In fact, the FMCSA, along with industry advisors, devised a model curriculum for the training of entry-level truck drivers over 25 years ago. The agency has also repeatedly acknowledged that training provided by many private and publicly funded schools and motor carriers is deficient. However, no uniform training curriculum or minimum training standards have been codified into law and made mandatory for entry-level heavy truck drivers.

Many previously believed the establishment of Commercial Driver License (CDL) requirements would be sufficient to improve highway safety. But, in reality, CDL requirements represent a licensing standard, not a training standard. Even today one may obtain a CDL by passing a series of "written" exams and a "skills" test without the completion of any required training.

TABLE 4
MINIMUM PTDI CLASSROOM/LABORATORY TRAINING REQUIREMENTS

UNIT NO.	STUDY AREA	TASKS	HOURS
1	Basic Operation	Vehicle Inspection & Control Shifting, Backing & Docking Coupling & Uncoupling	18
2	Safe Operating Practices	Visual Search Speed Management Space Management	8
3	Advanced Operating Practices	Night Operation Extreme Driving Conditions Hazard Perception Emergency Maneuvers Passive RR Crossings	14
4	Vehicle Systems	Maintenance Diagnosing Malfunctions	6
5	Non-Vehicle Activities	Hours-of-Service Accident Procedures Handling Cargo	43
	Discretionary Hours		15
Total			104

Even the International Brotherhood of Teamsters, a group acutely interested in the licensing of additional heavy truck drivers, has acknowledged that mere possession of a CDL does not guarantee that a driver has the necessary experience and skill to safely operate a commercial motor vehicle (Federal Register, 2003).

The CDL "skill" test (commonly known as the road test) may even be administered by third party entities on behalf of many state governments today. These third parties are often the very schools providing entry-level training to students seeking employment as heavy truck drivers. This practice may be convenient and cost effective for state governments but it raises an ethical question in the minds of many regarding a conflict of interest on the part of truck driver training school administrators.

Most transportation related injuries and deaths occur in the motor carrier industry and a significant amount of property damage results from crashes in this sector. There is also an ongoing shortage of heavy truck drivers in certain segments of the motor carrier industry. Mr. Bill Graves, President of the American Trucking Association at an industry conference, recently quantified the significance of this shortage (Reddy, 2006). He placed the current shortage at 20,000 drivers, growing to 111,000 drivers by 2014. Much of this anticipated shortage is related to the imminent retirement of many existing "baby-boom" generation commercial drivers.

Another measure of highway activity and heavy truck exposure is provided by the amount of freight moved by trucks over time. For example, from 1993 to 2002 total ton-miles transported by truck increased from 931 to 1,449 billion ton-miles (BTS 2002). This trend is not likely to be reversed given projected GNP growth and U.S. dependence on imported goods requiring a constant need to move goods from port areas to inland markets. Succinctly stated, many new heavy truck drivers will soon be required. Also, the DOT is currently taking steps to soon allow 100 Mexican trucking companies to begin operation throughout the U.S. (Corsi, 2007). There is likely to be much concern with the type and degree of training possessed by these foreign heavy truck drivers, among other issues.

Some would argue that a clear need exists for the establishment of a uniform curriculum and mandatory training for entry-level heavy truck drivers. An adequate amount of proper training has been shown to increase the likelihood of competence in many human endeavors. The model curriculum as adopted and modified by the Professional Truck Driver Institute provides a roadmap to consistency in the training and development of individuals desiring to operate the largest, and potentially most dangerous vehicles, on our nation's highways. Many laws and regulations pertaining to transportation vehicles and safety are "written in blood," hasn't enough already been shed? If this is not the time to adopt a uniform curriculum and mandate entry-level heavy truck driver training, when will the time come?

REFERENCES

Barr, B. and T. Gibbs (2006), "Oppose CDL 'Third-Party Test' Proposals," *Light and Medium Truck*, 19 (8): 44.

_____(2006), *Code of Federal Regulations*, U.S. Government Printing Office, Washington D.C., National Archives and Records Administration.

Corsi, Jerome R. (2007), "It's Official: Mexican Trucks Coming," *World Net Daily*, February. [On-Line] Available: www.worldnetdaily.com/news/article.asp?ARTICLE_ID=54411. Accessed 5 March 2007.

- _____(2003), *Federal Register*, 68:158, U.S. Government Printing Office, Washington D.C., National Archives and Records Administration.
- _____(2004), *Federal Register*, 69:99, U.S. Government Printing Office, Washington D.C., National Archives and Records Administration.
- _____(FMCSA 2006), *Large Truck Crash Overview 2004*, U.S. Department of Transportation, Washington D.C., Federal Motor Carrier Safety Administration, Analysis Division.
- _____(2002), *Freight Shipments in America, Preliminary Highlights from the 2002 Commodity Flow Survey*, U.S. Department of Transportation, Washington D.C., Bureau of Transportation Statistics.
- Mejza, M., Barnard, R., Corsi, T. and Keene, T. (2003), "Driver Management Practices of Motor Carriers with High Compliance and Safety Performance," *Transportation Journal*, 42, (4):16-29.
- Monaco, K. and Williams, E., (2000), "Assessing the Determinants of Safety in the Trucking Industry," *Journal of Transportation Statistics*, 3, (1):69-80.
- _____(NHTSA 2006), *Traffic Safety Facts 2004*, U.S. Department of Transportation, Washington D.C., National Highway Traffic Safety Administration, National Center for Statistics and Analysis.
- _____(NTSB 1998), Remarks of Mr. Jim Hall, Chairman of the National Transportation Safety Board before the American Trucking Association's Conference on Highway Accident Litigation. [On-Line]. Available: www.nts.gov/speeches/former/halljh980914.htm. Accessed 27 November 2006.
- _____(PTDI 1999), *Curriculum Standard Guidelines for Entry-Level Tractor-Trailer Drivers Courses*, Professional Truck Driver Institute, Inc., Career Publishing, Inc., Orange, CA.
- _____(Public Citizen 2005), "Federal Rule on Truck and Bus Driver Training is Useless, Doesn't Require Any Road Experience," [On-Line]. Available: www.citizen.org/pressroom/release.cfm?ID=1929. Accessed 16 November 2006.
- Reddy, T. (2006), "ATA's Graves Says New Federal Rules Will Add to Driver Shortage Problem," *Transport Topics*, Alexandria, VA, Issue 3710.
- _____(2006), *Statistical Abstract of the U.S. 125th Edition*, Section 23: Transportation, Table 1051, U.S. Census Bureau, Washington D.C.
- _____(STCW 2005), "Standards of Training Certification and Watchkeeping 1995" [On-Line]. Available: <http://www.stcw.org/training.html>. Accessed 19 November 2006.
- _____(2005), U.S. Court of Appeals, District of Columbia, Case Number 01-1223 [On-Line]. Available: www.pacer.cadc.uscourts.gov/docs/common/opinions/25012/04-1223a.pdf. Accessed 6 December 2006.
- _____(USCG 2006) "Merchant Mariner Licensing and Documentation", U.S. Coast Guard [On-Line]. Available: www.uscg.mil/stew/ldcr-mmdinfo.htm. Accessed 3 December 2006.

AUTHOR BIOGRAPHY

Harry L. Sink, Ph.D. is currently an associate professor of transportation with North Carolina A&T State University in Greensboro, North Carolina. His research interests include motor carrier management and third-party logistics; previous publications have appeared in the *Journal of Business Logistics*, *International Journal of Physical Distribution and Logistics Management*, and the *Journal of Transportation Law, Logistics and Policy*. Dr. Sink has served as a transportation director with two large manufacturing firms and been employed with two Class 1 motor carriers. He also provides expert advisement in commercial trucking litigation.