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Comments on the Proposed FMCSA Rulings

A new Perspective on Driving Simulators and Why They Should be Given Serious Consideration for Entry Level CDL Training

Submitted by

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Petition for review and reconsideration for the use of driving simulators to be allowed to be used in the training regimen for CDL students or "The parable of the Emperor and the GS-12"

When the child called out from the crowd that the emperor had no clothes, he caused quite a stir. That abrupt introspection caused the crowd to reconsider their perspective and the nature of their observation. The proposed rulings from FMCSA regarding the marginal use (or more to the point, highly limited use) of simulators in the CDL training process compels me to shout that the FMCSA has no clothes. Like the child in the crowd, my shout is based on what I see. And what I see is a conspicuous absence of serious consideration for understanding the value that driving simulation technology can provide as well as a process by which it can be included.

Perspective and Personal Disclosure

This petition reflects my personal views and over twenty-years of simulation and training industry experience and is intended to create introspection and open dialog. It does not officially represent any other opinion or perspective. In the interest of brevity, I apologize for any umbrage taken, oversight or failure to give recognition to past and present contributions. Offense was not intended. It is not my intention to embarrass or demean prior and on-going efforts to address this issue. However, given the present state of the economy and the federal government's track record in addressing this subject to date; I feel compelled to offer this perspective in hopes of leveraging every opportunity to benefit a critical industry (CDL Schools) providing an essential product (a quality trained driver). No animals were harmed during the construction of this tome, although our cat did go cross-eyed during a private reading.

What compels me to take issue with the FMCSA Proposed Ruling as written?

My greatest concern is that the rules being considered for stabilizing and conforming the CDL training process may actually isolate the training process from considering new and innovative technologies. As written, the proposed ruling navigates a morass of political, economic and business agendas. The final goal is often quoted as standardizing CDL training for the betterment of the industry. The output of the standardized training is to be an improved or at least consistently qualified driver. What is not apparent from my perspective is that the one process that can provide the equalizing affect with objective, consistent and compliant training is not being given the consideration that it warrants. This may be a result of defaulting to traditional processes rather than addressing something that may not be fully understood.

The potential benefit based on present experience is too compelling to ignore. Given the impact that CDL schools and transportation companies are experiencing from the weakness of the economy and the cost of fuel, we need a way to constructively evaluate new and innovative approaches that can help mitigate this impact. The ruling should include a process for validating the benefit from allowing new technologies to be included in the authorized training curriculum. These technologies provide applications that can improve school productivity, increase school throughput, and benefit the student with objective driver measurement and training processes. If we implement a policy that does not assist the schools economically, achieving consensus on standards of training and curriculum may be a moot issue to their survival.

First, lets remove some confusion in definitions. What is a simulator and when is a simulator a training devise?

The first point and one of the most important to clarify is the difference between a driving simulator and a driver training device. Stated simply, a driving simulator is a hardware or software replication of a truck, van or car. A driver training device is an applications tool (in this case a simulator) that is designed to provide sufficient fidelity in replicating the behavior of a truck, van or car combined with instructional content, driver measurement and student performance comparative reporting.

I will be the first to admit that except for a few innovators that lead the pack, driving simulation has been poorly understood and as such poorly implemented in training to date. The federal and state governments, their regulatory agencies, the training industry that uses simulation and the manufacturing industry that provides simulation, all have a responsibility to ensure that where simulation technology is being used for training, it is used correctly.

This responsibility cannot be executed in ignorance. The crux of the problem focuses on all parties developing a better understanding of how the simulator and its application package can be efficacious for its users. I propose that we design a program in conjunction with a qualified research facility to provide insight, objective data, and focus on the training effectiveness of simulators and CBT. The study should also define and establish the working parameters for a simulator to function as a CDL training device within a driver training program. It will be a technology in training validation program.

In the simulation world, fidelity refers to how well the simulator matches the actual vehicle's behavior and performance. It is generally a cost issue – the higher the fidelity, the higher the cost. In the training world, fidelity is identified with validity and is measured by many factors including student acceptance and transfer of training. However, here is where reality and value split.

At this point it would be fitting to mention two other terms that are often used interchangeably with fidelity and realism. They are **Face Validity** and **Construct Validity**. When these terms are used inappropriately, that adds to the confusion. These terms mean the following; "***Face Validity***" is what you see to be real or close to actual in the simulator hardware or environment; hence, the fidelity. "***Construct Validity***" is the training program's ability to have a similar result as a real experience. This is sometimes mistakenly referred to as realism. However, it is only an expression of training effectiveness or the transfer of training efficacy which may or may not have anything to do with realism and everything to do with Instructional Design and implementation of training processes and techniques.

The absence of these terms in the proposed ruling is what is conspicuous to me; like the emperor's cloths, that draws my attention and concern. At some point a child in the crowd will shout, "Does FMCSA know this?" It is not my intent to add confusion but to ask; "what is it about **fidelity** and **training efficacy** that is not pertinent to CDL training?

Simulator training effectiveness does not require realism (100% fidelity) in order to provide training value. It does require a definition of the intended task so that the simulator's required performance (usually represented in a training software package) can be designed by Instructional System Designers (ISD) to achieve functional efficacy. There is often an assumption that the amount of time a student spends in the simulator is correlated to time in a real vehicle or that it can provide adequate learning and transfer of training. The reference to time in a simulator can only be effective if a structured, disciplined and measured curriculum controls the simulator's use. The FAA is very experienced at implementing this process. There use of extremely high fidelity simulation complements their highly structured training curriculum resulting in a seamless transfer of training in a short period of time. This training is so successful, that a pilot can qualify to fly a different aircraft with passengers without spending one minute in the actual aircraft. Several other attributes are also essential for training to occur and I will mention them shortly.

Before we proceed, there is one point that needs to be clarified; as it is often misunderstood or confusing to educators and training providers and most particularly the manufacturers of the simulators. And that is: "A driving simulator is not a driver training device." For a simulator to be used for training it must incorporate training software, not just scenarios and a database. That software effectiveness will depend upon its ability to present and control the scenario, measure the driver's performance and make comparative analysis for determining progress. With that minimum functionality, the simulator must then be integrated into a training regimen to apply the driver's experience in the simulator to complement and complete the training curriculum. The purpose of the proposed study is to establish definition of performance and methodology for measuring driver training devices and setting minimum performance criteria sufficient for CDL training.

The role of synthetic training and why it is often misunderstood

Simulators have been used successfully for many years in other areas besides driver training: flight training, rail training, ship and power plant training, engineering development, and vehicle research to name a few. So what is the secret to successfully using a simulator in these other applications and why is it so difficult to get supportive data for measuring a simulator's value for driver training? The simple answer is two fold: 1) user expertise and 2) politics and agendas.

User expertise

Because a driving simulator is a representation of a vehicle and we all know what a car, van or truck is; we apply this over familiarization with the real vehicle to how we view and shop for a simulator. The more realistic it feels, the better it must be; that is a misuse of the term **"Face Validity**." In the realm of driver training, this perspective fails to provide any simulator application awareness. Roughly translated, that means understanding how the simulator can be used: or in other words, its **Construct Validity**. It is not easy to change how people think. For many years, the simulator has been used as a replacement for a truck, bus, van or car. Its scenarios were used to impart an experiential-based training event providing an expert trainer and Computer operator was standing by to enlighten the student. This is a very traditional perspective and like it or not, it dominates the driving simulation community from manufacturer to user.

Case in point: When was the last time a driving simulation manufacturer asked you about your training program? Does the manufacturing company have Instructional Designers on staff? Do they analyze your program for a best fit of their product's application; or do their salesmen tell you what you need and who else is using it and what it can do "driver's say it feels just like a truck". Many of the simulators being offered have many good qualities and features. However, it is up to you the user to find training value in it, either through its options or outside vendor packages. Makers of driving simulators sell iron that can take you to the edge of your performance. (batteries not included = you have to make it work)

On the other hand, let's look at the users of driving simulation technology: schools, trainers, transportation companies. This group is a little different than the users of research, engineering and flight simulators. The main difference, except for a few innovators, is in the familiarity that one group has with the technology in addition to the controls and definition imposed for its application by regulatory agencies like the FAA and the NRC. There are agencies within government that actually understand simulation technology and its application process.

Few transportation companies or CDL schools for that matter employ experts in Instructional Design or synthetic training technology adaptation. They use trainers who are skilled in handling the vehicle and whose task it is to transfer that experience to a student – learn by doing. And why should they do anything else? Curriculum is already defined and approved. Trucks are used for range and road training and simulators are used (smoke'm if you got'm) to replace trucks. There are several things missing from this picture, but the main issue is lack of agreed upon standards for the use of training technologies.

In driving simulation, there are no functional or applications performance standards. What ever the manufacture provides is what you get. You want a simulator, you get a simulator. You want a driver training device integrated into your training program, you get a simulator. This is where a research program can establish minimum reference standards for an unregulated industry (simulation) and for users who are not familiar enough with the technology to use it effectively. Until that is done, simulators will be bought and sold like Chevy's and Freightliners. (Caveat emptor = you have to make it work or Face Validity dominates Construct Validity)

Politics and agendas

Look at the political stew that all of this has been tossed into. Without clear and defined methodology for embedding simulation into curriculum, there is no way to establish standards. Without measuring driver/student performance, how do you judge competency and proficiency objectively? Is there any wonder why training is dictated by time? Time is one of the few training components that can be objectively measured by someone like the government. Lets look at who the players are: FMCSA, ATA, PTDI, State DOTs, CVTA, and a host of thousands (non affiliated schools and trucking companies). These groups have the best interests of their constituents at heart. They all want the same thing: a safe and well trained driver as a product of a standardized CDL training program. Also keep in mind that the CDL licensing program is a revenue issue for States, and no politician gives up revenue or power easily. Driving simulation technology can contribute to achieving a competency-based training program, but it needs to be studied, analyzed, and proven with measureable data so that all interested and concerned parties can have confidence in the expected outcome from using simulation.

How to Proceed

Obviously a step in the direction of sharing data that exists and qualifying that data for pertinence is essential. Engaging a credible training and research facility to conduct a proof of concept and contributed value analysis of new technologies is needed, but it must be associated with a CDL experienced training school. What is needed is driver performance data that is easy to access and understand, sufficient in quantity and that shows in an apples to apples comparison just how to use technology and integrate it into authorized curriculum. Remember that it is not the technology that is critical here; it is the implementation and application of the technology in a training regimen that is the essence for the comparative evaluation. There are several on-going evaluation programs now in progress. They are not all the same. They have different purposes or methodologies. We need a curriculum, and a transfer of training study to reinforce or corroborate present and past findings.

Precedence for considering this petition

There is mounting evidence that driving simulation technology can offer the economic and operational benefits demonstrated in other simulator applications. Implementation of a

controlled and structured training protocol and integration into a training curriculum has worked. Europe has authorized and legislated the use of simulator-based driver training systems to refresh and demonstrate driver skills. I know what you are thinking, there not from around here. However, their EU Directive 2003/59/EC defines the compulsory Initial Qualification and Periodic Training for Professional Drivers of vehicles for carrying goods or passengers with specific emphasis on simulation. It's a start.

On a more local level there is an on going transfer of training analysis and valuation of skills research study being conducted in Utah for EVO training. Again, it's a start. All that this says, it that the empire is changing and how the emperor is seen is largely a matter of intelligent choices that allows a traditional industry to employ non-traditional solutions. Don't make simulation an augmentation to a program that can be slipped in as an after thought. Make a path in your rulings for its process to be an objective training equalizer. Experience has demonstrated that when you don't know how to measure the results you end up measuring the process. The nation needs a study that defines performance, identifies a successful methodology for measuring driver training devices and their transfer of training capability and that collects data sufficient and pertinent for setting minimum performance criteria for CDL training incorporating simulation.

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