Keep on Truckin’- Using Simulators for CDL Testing During COVID-19

November 6, 2020
1:00-2:30 PM Eastern
PDH Certification Information:

• 1.5 Professional Development Hours (PDH) – see follow-up email for instructions

• You must attend the entire webinar to be eligible to receive PDH credits

• Questions? Contact Reggie Gillum at RGillum@nas.edu

#TRBwebinar
Learning Objectives

1. Identify how truck simulators are used as valid testing instruments

2. Discuss how truck simulators compare to typical CDL test methods
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Keep on Truck’in! Using Simulators for CDL Testing During and After Covid-19

TRB 2020
Pierro Hirsch
John Rojas
Plan

1. The Covid-19 Challenge
2. Background - Military, Aviation and Medical Use of Simulation
3. Demonstrated Validity of Truck Simulators
4. Applications - Truck simulators in the Skill Portion of CDL Testing
5. Summary of Advantages of Truck Simulators in CDL Testing
The Covid-19 Challenge

Driver shortage ranks #1 among all trucking industry issues for the fourth year in a row.*

* CRITICAL ISSUES IN THE TRUCKING INDUSTRY, The American Transportation Research Institute. October 2020
Traditional CDL driver testing is conducted by professionals in the passenger seat of the cab of the truck.

Center for Disease Control guidelines for social distancing strongly advise against this practice.
Controlling exposures to occupational hazards is a fundamental way to protect personnel. Conventionally, a hierarchy has been used to achieve feasible and effective controls. Multiple control strategies can be implemented concurrently and or sequentially. This hierarchy can be represented as follows:

- Elimination
- Substitution
- Engineering controls
- Administrative controls
- Personal protective equipment (PPE)

[Diagram of Hierarchy of Controls]

The Covid-19 Challenge

New CDL Licensing Across the USA – April 2020 *

- 30 States - No Issuance (59%)
- 9 States - No Restrictions (18%)
- 9 States - Appointment Only (17%)
- 3 States - Limited Service (6%)

1 The Covid-19 Challenge

As of September 2020, DMVs across the country are gradually reopening, but on an appointment-only basis.

“On average, states are issuing credentials at a 60-70% capacity”.

Tom Keane, Director of Safety Programs FMCSA
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[Hierarchy of Controls Image]

CDC Strategy for Protecting Personnel During COVID-19

CDL testing on truck simulators will allow evaluators to observe and interact with driver trainees from a safe distance.
Polling Question #1

Have you ever worked with driving simulators, and if so, for what purposes?

(Please indicate more than one answer, if applicable)

A) I have used car simulators for driver training, testing or research.
B) I have used truck simulators for driver training, testing or research.
C) I have no first-hand experience working with car or truck simulators.
D) I am interested in learning more about driving simulation.
The more the simulator (i.e. environment and human performance metrics) replicates the real world, the better the *transfer between* the simulator and the real world.
2 Proof of Concept

Seat-of-the-pants experience

Simulator-based training & testing
Full Flight Simulator - Pilots achieve airplane-specific ratings without using the real aircraft.

Zero flight time training!
Military Simulation
Medical Simulation
Simulation - A Proven Solution

Simulation is proven effective tool.

Commercial aviation, the military and medical schools all include simulation in their training / testing programs.
Dozens of studies demonstrate that drivers’ performance on truck or car simulators closely matches how they drive real vehicles on real roads. *

* Contact Pierro Hirsch for a list of references
Debrief Station: https://youtu.be/jJdfdkDvgYA
Driving simulators can objectively measure driver performance to determine **meaningful benchmarks** based on vehicle control metrics, error rates and task completion times.
Researchers* compared three different CDL driver training methods.

- Truck simulators
- Conventional BTW training courses
- Short BTW CDL-focused courses

Each group was evaluated on a specially constructed simulator test programmed to the exact criteria of the DMV road test.

**Results:** Participants with longer training courses (the conventional- and simulator-trained groups) had significantly higher scores than participants from the CDL-focused courses with a much shorter duration.

Simulator Testing Superior to Road Tests

No road test has ever demonstrated predictive validity for safer driving records.

However, there is growing scientific evidence that simulator-based driver evaluations can predict on-road performance.*

* Contact Pierro Hirsch for a list of references
4 steps in CDL Testing

- Theory Training
- Vehicle Inspection
- Backing
- Driving
Theory Training

- Students must pass knowledge tests to obtain a Commercial Learners Permit
  - General Knowledge
  - Airbrakes
  - Vehicle Inspection
  - Coupling/Uncoupling
  - Special Requirement (Learners Permit)
There are over 100 parts on vehicle inspection check list that a student must know their specific names and what exactly they are looking for.

This section of the test requires a lot of memorization.

A thorough inspection will take on average 30 to 45 min.

The use of simulation is very productive for students to utilize because they can utilize SIM instead of actual truck.
CDL Testing requires drivers to demonstrate at least 3 backing maneuvers. It's up to each state to decide which one of the below they choose to utilize.

1. Straight Line Backing
2. Off Set Backing - Drivers Side
3. Off Set Backing - Blind Side
4. Parallel Park – Driver Side
5. Parallel Park – Blind Side
6. Alley Docking
The Driving Skills Tests requires Students to demonstrate they can operate a commercial vehicle safely.

- Speed Management
- Proper Lane Changes
- Proper Right & Left Turns
- Safe, Smooth Stops
- Crossing Railroad Crossings
- Observation Skills
- Shifting
- Approaching intersections
- Entering & Exiting Freeway ramps
4 COVID – 19 Safety Procedure

- Cleaning
- Social Distancing
- Reduced Student Instructor Rations
- CDL Testing Scheduling Delays
COVID Complicates CDL Testing

Driver testing under COVID


Safety first, always!
Cleaning the Simulator: https://youtu.be/0pcpOoTrpsA

Safety first, always!
Alternate modes of testing the same knowledge
Applications for CDL Testing

City Turns: https://youtu.be/trMwE1reT5A
Applications for CDL Testing

Alley docking practice
CDL Alley Docking – No Pull Ups

Alley Dock No Pullups: https://youtu.be/mM-vK_WER3M

Video provided by Central Tech Drumright
Alley Docking in Truck Simulator

Alley Docking on Simulator: https://youtu.be/jqv8WiEfW_I
Conventional Side Parallel Parking: https://youtu.be/rY05O1WrdtQ
4 Parallel Parking
Parallel Parking on Simulator: https://youtu.be/tiSz1z6Gqy4
Railroad Crossing: https://youtu.be/5IXeodzzxFY
Common Hazard Perception: https://youtu.be/w0pHttarnjE
# CDL Road Test Score Card

## Del Mar College Transportation Training Services

### Driving Road Certification

<table>
<thead>
<tr>
<th>Start</th>
<th>Bed</th>
<th>Good</th>
<th>Down Shifting</th>
<th>Bed</th>
<th>Good</th>
<th>Approach to Corners</th>
<th>Bed</th>
<th>Good</th>
<th>Sign Recognition</th>
<th>Bed</th>
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<td>Signal</td>
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<th>Quick Stop</th>
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<th>Good</th>
<th>Lane Changes</th>
<th>Bed</th>
<th>Good</th>
<th>Traffic Signals</th>
<th>Bed</th>
<th>Good</th>
<th>Merger/Spacing</th>
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Instructor Signature: ___________________________ Date: ________________

Student Signature: ___________________________ Date: ________________

Score: ___________________________
Mountain Driving: https://youtu.be/bfCfn20dBg8
Advantages of Simulator-based Testing

- Safety for personnel during COVID
- Safe space for backing after COVID
- Expanded capability to reliably and safely test critical skills hazard perception and railroad crossing
- Increased potential for screening unsafe drivers by using norm-based objective performance scores.
Question / Discussion
Polling Question #2

Based on the preceding presentation, what is your current level of appreciation of the potential benefits of using truck simulators for CDL driver testing?

A) I see the added benefits of using truck simulators in CDL testing during COVID restrictions.

B) I see the benefits of using truck simulators during COVID restrictions and continuing to use them for CDL testing after restrictions are removed.

C) The current methods of on-road CDL driver testing are adequate.
Polling Question #3

Do you think a pilot CDL simulator test project would be helpful?

Yes

No
For presentation references contact: pierro.hirsch@viragesimulation.com
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• 100\textsuperscript{th} TRB Annual Meeting is going virtual January 2021
• Follow online using #TRBAM
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Other TRB events for you

• **November 12:** TRB Webinar: Celebrating TRB’s Centennial by Exploring the Future of Transportation Research

• **November 16 - 18:** Workshop on Traffic Simulation and CAV Modeling

• **November 18, 2020:** TRB Webinar: Protection Detection – Making Roads Safe for Drivers and Wildlife

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