

## Is That Commercial Driver Really Fit to Drive? An Update

Fitness for Duty, Readiness to Perform, & Performance Testing

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## Why Is This Important?

### Workplace Risks

- Fatigue
  - Alcohol
  - Drugs incl. OTC
  - Illness
- Regulatory Requirements
- Advocacy Group & Societal Pressures  
**& Because Employers are Constantly Being Offered Questionable "Solutions"**

## History

- **1991** – NYC subway crash – motorman BAC .21 – 5 deaths
- **1987** – Freight and passenger trains crash in Elkton MD– 16 deaths – engineer impaired by marijuana
- **1988** – USS Vincennes shoots down Iranian airliner – 290 deaths – severe stress and fatigue
- **Current** – NHTSA estimates 35% of single vehicle truck crashes due to driver fatigue

## Fatigue Related Crashes (FHWA)

- As high as 2.7% of all police reported crashes involving tractor trailer units
- As high as 7.6% of all fatalities associated with tractor trailer crashes
- As high as 36% of all crashes fatal to the tractor trailer driver

Can we identify impaired operators before a crash?

## Truck Driver Injuries and Fatalities

- Highest number of work-related fatalities of any occupation
- Fatality rate 10-12 times the rate for all workers
- Account for 40% of all worker deaths from highway crashes
- 2<sup>nd</sup> highest number of days-away-from-work (DAFW) injuries
- 3<sup>rd</sup> highest number of DAFW injuries from musculoskeletal disorders
- DAFW injuries result in median 14 lost work days

CDC / NIOSH TRB, January 2007

## Fitness for Duty Defined

- Examinations focused on worker
  - Not an assessment of actual job performance
  - Sometimes assessment of simulated task
  - Often pre-hire or condition of employment
  - Typically based on pre-established standards
  - Fails to consider post-exam or interim risk factor changes
- Examples: CDL Exam, pre-employment lifting standards, general cognitive testing, pre-placement medical exams, timed critical tracking, perceptual, short-term memory, etc.

## Being “Fit for Duty” Means...

- Examiner judges applicant is capable of performing the job – as the Examiner knows it...
- Applicant does not currently exhibit risk factors that might influence job performance:
  - Drugs
  - Alcohol
  - Illness

### Example: The Epworth Sleepiness Scale

#### Situation

#### Chance of Dozing

- Sitting and Reading
- Watching TV
- Sitting inactive in a public place (e.g. a theater or a meeting)
- As a passenger in a car for an hour without a break
- Lying down to rest in the afternoon when circumstances permit
- Sitting and talking to someone
- Sitting quietly after a lunch without alcohol
- In a car, while stopped for a few minutes in traffic

0 = No Chance of Dozing  
1 = Slight Chance of Dozing  
2 = Moderate Chance of Dozing  
3 = High Chance of Dozing

## So – How Likely ARE You to Fall Asleep in Specific Situations?

- 1 - 6 Congratulations, you're getting enough sleep!
- 7 - 8 Your score is average.
- 9 and up Seek the advice of a sleep specialist without delay.

*Not likely useful in a typical business environment.  
Too subjective. Self-administered. Requires professional interpretation.*

## Readiness to Perform Defined

- Immediately pre-shift
- Can simply be a planned conversation with worker
- Fairly common
- Evaluate job-related criteria
- Often compared to pre-established baseline
  - Objective or subjective
- Predictive of an essential job-related function
  - Examples – Saccadic velocity, Standardized Field Sobriety Test (SFST), Epworth Sleepiness Scale – self administered “test”

## Definition of RTP Assumes:

- Employee has been prepared for the job
- Has training and education to know the job requirements
- Physically, mentally and emotionally suited to job demands
- Skills and abilities match the job requirements
- Is *willing and motivated* to do the job

## Performance Testing Defined

- Direct evaluation of job performance in real-time
- Comparison to individual pre-established baseline – or to company performance standards
- Utilizing in-vehicle technology
  - Examples: pupillary reflex, lane tracking, steering wheel movement, head movement

## Pro's & Con's of Readiness to Perform & Performance Testing

- Pro
  - Much more likely to ID real-time risk factors
  - No specific risk factor ID'd
  - Immediate results requiring no “interpretation”
  - Personal privacy issues not impacted
  - Pre-shift testing becomes regular and expected
  - Video arcade type tests acceptable to younger population
  - “Other” risk factors ID'd
  - Results more acceptable if workers & supervisors understand the test

## Pro's & Con's

- Con
  - Not mandated – e.g., DOT drug testing
  - Another non-revenue generating expense
  - Critical tracking test may not ID impaired state because of “tolerance” to substance
  - Employees may “recruit” to pass test
  - Scientific validity compared to vendor claims
  - Every day pre-shift testing impacts productivity
  - Only performance testing detects onset of impaired state during shift – REAL TIME

## Fatigue

- Physiology of fatigue well known
- Biological “clocks” well documented
- Humans are programmed to sleep at night

### Fatigue Occurs When:

- We work when our “clock” tells us we should be sleeping or vice versa
- We get less than normal or poor sleep
- We work very long hours or have too little time to recover from previous work
- We have medically related sleep problems

## Fatigue Risk Factors

- |  |  |
|--|--|
| • Driving when usually sleeping            | • Extremes of temperature                                    |
| • Long continuous hours driving            | • Alcohol or drug abuse                                      |
| • Inflexible schedule permitting no breaks | • Medical sleep problems e.g., Sleep Apnea                   |
| • Poor or no sleep previous night          | • Health problems e.g., Diabetes                             |
| • Irregular shift                          | • Etc.....   |
| • Driving in remote areas                  | <i>Obviously, not all are specific to truck drivers.....</i> |

## Commercial Truck and Bus Safety

### Synthesis 9

Literature Review on Health and Fatigue Issues Associated with Commercial Motor Vehicle Driver Hours of Work

*A Synthesis of Safety Practice*

195 Pages

TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES

## Imagine the Fleet Managers Dilemma

[http://dmoz.org/Computers/Software/Human\\_Resources/Testing\\_and\\_Evaluation/](http://dmoz.org/Computers/Software/Human_Resources/Testing_and_Evaluation/)

191 Links to “Testing & Evaluation” Products

## A Device to Detect One's Readiness to Perform

- **FIT 2000** – good science, meets criteria for ease of use, control, data security, etc.
- “Alert” threshold equivalent to BAC 0.10
- Measures saccadic velocity and constriction latency – accurate indicators of fatigue
- Compares to pre-established personal baseline
- But – not real-time, during shift, monitor

## The FIT® System by PMI, Inc.

“It's proprietary technology can assess whether a person is significantly impaired by **fatigue, legal medications, illegal drugs, alcohol, sleep deprivation**, alone or in combination.”

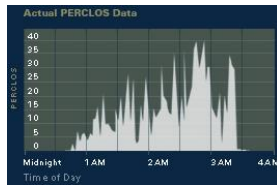
Characteristics (Marketing Literature):

- 30 Second Test
- Instant Results
- Non-invasive
- Spots effects of drugs, alcohol, and meds.
- Results Cannot be Gamed or Faked
- Inexpensive Per Test Cost
- Rigorously Validated by Major Researchers
- Field Tested by Demanding Customer



## An Example of a Performance Testing Device – Real Time

- **Driver Fatigue Monitor (PERCLOS)** – in-vehicle, real-time monitor of driver fatigue. Good science. Monitors drivers eye position and eye closure using IR. Alerts up to hour in advance. But - driver may not stop when ID'd as impaired.



## PERCLOS Concept

Drowsy person will blink distinctly slower than when they are alert.

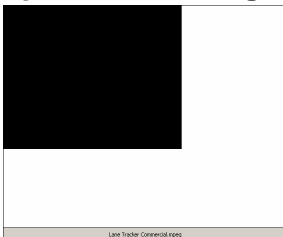
Also, they'll close their eyes for a longer time than when alert. PERCLOS is designed to identify when those characteristics occur.

Also under development – measurement of:

- Eye Gaze
- Facial Expression
- Head Movement



## Lane Departure Warning Systems



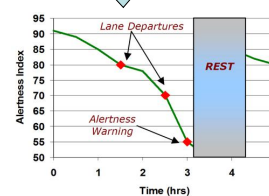
Originally developed to warn of onset of fatigue  
Now also used to measure driver center-of-lane performance, ► DATA!

Used in Many Fleets

## Lane Departure Warning System (LDWS)

86% "Alertness Score"

And it Creates Driver Performance Data!



Real-Time Driver Warnings



## DriveCam Video Event Recorder



- Mounts on windshield
- Driver sees when event recorded – immediate feedback
- Events triggered by  $\Delta V$
- Digital looping memory captures 10 sec. before and after event
- Records color video, audio and G-forces, both looking forward and backward
- Downloads to PC – Wireless uploads to central site
- Events interpreted by vendor

## What the Driver Didn't See



## What the Camera Did See



Of all the devices, this one is best for real-time, driver behavioral and performance management.

## Employee Acceptance of Testing

- Employees must understand:
  - What it is intended to do
  - What it is not intended to do
  - Why it is being implemented
  - Where they can go to understand the results
    - HR
    - Supervisor
    - Occ Doc's

## Management Acceptance

- Managers must understand:
  - Failed test is not confirmation of use of illicit drugs
  - Failed test may be indication of:
    - Cumulative effect of fatigue from home or work pressures or schedules
    - Effects of circadian rhythms
    - Prescription or OTC drugs
    - Alcohol or illegal drugs
  - How to handle false positives
  - Role of Occ Doc's as consultants

## What About Psychological or Aptitude Testing?

- Typically considered pre-employment tests
- But - - the literature agrees that for jobs requiring unusual self control, tests may have relevance
- Potential for “vendor hype?”
- *Best predictor of future work performance is prior employment history*

**Here's What We Tell our Customers –  
Can You Help Them Get Answers?**

**1. Scientific / Engineering**

- Validity – does it measure what it's supposed to do?
- Reliability – does it measure the same thing consistently, over time & across workers?
- Generalizability – does it measure the same event in everyone?
- Sensitivity – What proportion of persons does it detect when impairment is actually present?
- Specificity – How often does it false alarm?

**2. Practical / Implementation**

- Ease of use – can nearly everyone use it correctly?
- Acceptance – will the target population use the technology?
- Unobtrusiveness – Is the technology convenient to the user?
- Robustness – can the technology withstand heavy use?
- Interpretation – are trained users consistent?
- Economical – is it cost effective?

**3. Legal / Policy**

- Purpose – what is the goal of implementing the technology? Is it mandatory for all?
- Privacy – who has access to the data & where will it be stored?
- Enforcement – will it be used for enforcement, compliance, or advancement/demotion? What's the plan?
- Misuse Potential – can it be misused? (e.g., impaired person continues to operate by their own choice or by the operating entity)
- Liability – who is liable if the technology fails to detect impairment of if it is misused ?

**Transportation Research Board Synthesis  
Study: December 2006**

**MC-16 "Health and Wellness Programs for Commercial  
Vehicle Drivers (2007)"**

Conclusions:

- Many truck & bus companies demonstrate too little appreciation for possible benefits of H&W programs
- Need cultural change, paradigm shift embracing integrated model of health, safety & productivity management
- Commercial driver advocates (e.g., FMCSA, ATA, NPTC, ABA, UMA, ATRI, etc.) have important roles to play
- Numerous corporate H&W experiences are available
- More successful case studies should be published
- Truck & bus companies need guidance how to do effective H&W
- Challenge is to effectively reach/involve mobile drivers

**Overall Conclusions**

- Technology at a point where it is useful in the transportation industry
- Management and employee education critical
- Effective HR program a must
- No amount of testing can overcome human need for rest