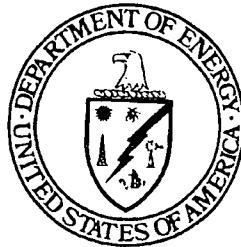


# **Legal Weight Truck Tractor / Trailer Testing**

**T. C. Smith**

**Transportation Department  
Civilian Radioactive Waste Management System  
Management & Operating Contractor**



**Nuclear Waste Technical Review Board**  
July 13, 1994  
Denver, CO



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# Set The Stage

- **Rail is the preferred mode of transport**
- **Limited legal highway transport required**
- **LWT transport system designed to transport GA-4/GA-9 cask**
- **Test objective to ensure LWT transport system is safe, durable and reliable**



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# LWT Test Stages

- **Trailer durability: 7/94 to 9/94**
- **Tractor performance test: 10/94**
- **Human factors considerations: 11/94**
- **Over-the-road operational assessment:  
12/94 to 5/95**



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## Briefing Outline

- **Where we've been**
- **Where we are**
- **Where we're going**
- **Why human factors?**
- **What we've learned**





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### Where We've Been

- **Tractor inspected/accepted: 11/93**
  - Hand receipted to Allied Signal Automotive Proving Ground, South Bend, IN
- **Public Road Data: 1 - 3/94**
  - 495 miles / 10 hours / 3 states
- **Determine durability route: 5 - 6/94**
  - Compute compression ratio



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# Where We're Going

- **Durability test estimated start date July '94**
  - Scheduled to run 7 - 9/94
- **Refurbish tractor and trailer: 9 - 10/94**
  - Repair to CVSA standards
- **Tractor performance testing**
  - Emphasis shift from trailer to tractor
  - 10/94





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## Where We're Going

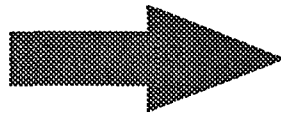
- **Human factors considerations**
  - Cab over engine vs. conventional tractor design
  - 11/94

**Do we pay a  
penalty in  
accelerated  
fatigue?**



## Why Human Factors?

- **Safety**
- **Drivers are weak link**
- **Culprits**
  - Inexperience
  - Driver training
  - Fatigue

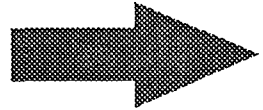


*60% of  
accidents  
are  
human  
error*

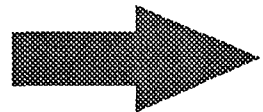




## Causes of Fatigue



- ***Noise levels***



- ***Vibration levels and frequency***

- **Cognitive task levels**
- **Air quality and temperature**
- **Positive posture support**
- **Lighting levels**
- **Physical and mental stress**



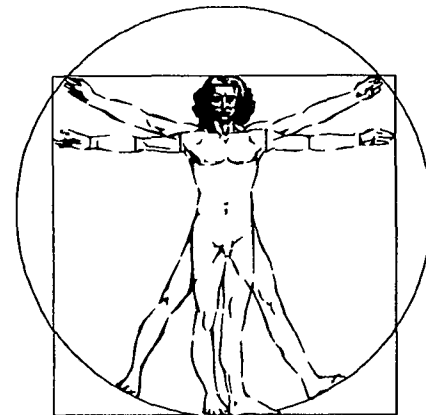


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## Human Factors Comparison

- **Compare driver response and performance between C.O.E. and conventional tractor**
- **Perform non-parametric tests to determine S-significance of performance data**

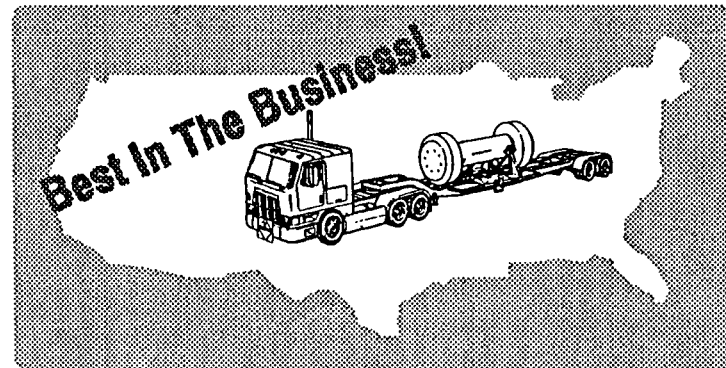




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# Where We're Going

- **Over-the-road operational assessment**
  - “Laps of America” shakedown
  - 16 sites / 13 states / 17,231 miles
  - Driver qualifications
  - 12/94





## What We've Learned

- **LWT tractor - shorten frame and split fender**
- **Compression ratio not uniform at all points on trailer**

*A Stressful  
evaluation!*



## Where Do We Go From Here?

- **Validate tractor and trailer design**
- **Capture design specifications for future procurement**