The Importance of Fleet Safety Culture to Reduce Crashes

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VTTI Organizational Structure

15 Research Programs and Groups

- Advanced Automotive Research
- Automated Vehicle Systems
- Data Reduction and Analysis Support
- Infrastructure-based Safety Systems
- Center for Partnerships, Public Policy and Outreach
- Injury Biomechanics
- Sustainable Mobility
- Sustainable Transportation Infrastructure
- Technology Development
- ***Truck and Bus Safety***
- Vulnerable Road User Safety
- Motorcycle Research Group
- Global Center for Automotive Performance Simulation
- Center for Technology Implementation
- National Tire Research Center

Truck and Bus Focus Areas

- Driver behavior and safety/health
- Safe operating conditions
- Education, training, and policy support
- Advanced vehicle technology

Industry and Sponsors

- Commercial Fleets
- Equipment suppliers
  - All US OEMs
  - Tier 1 and 2 suppliers
- Insurance
- Associations/Groups
  - Presentations
  - Discussions

Study Impact

- NY Times- In Study, Texting Lifts Crash Risk by Large Margin *July 27, 2009*
- Washington Post - Study Finds Link Between Text Messaging, Truck Crashes *July 29, 2009*
- CNN – Accidents Prompt Summit on Distracted Driving *August 4, 2009*
- CBS NEWS- Shocking Stats on Texting While Driving *August 29, 2009*
- NY Times- Texting While Driving Banned for Federal Staff *October 1, 2009*
- NY Times - Truckers Insist on Keeping Computers in the Cab *September 27, 2009*
- USA Today - Feds ban texting by truck, bus drivers *January 27, 2010*
- Land Line Magazine - The right call? *November 2011*
- Wright and Schulte – Ohio Truck Accidents: Texting Truck Drivers 23 Times More Likely to Crash *June 5, 2013*
- Robeson Forensic – Asleep at the Wheel: Sleep Deprivation and Fatigue in Commercial Trucking *March 11, 2014*
- VT News - Transportation institute awarded $55 million in federal contracts on truck safety, automated vehicles *July 21, 2014*
- Fleet Owner - FMCSA awards $2.5 million to study split sleeper impact December 30, 2015
- JOC.com – Virginia Tech to Conduct Critical Truck Driver Work Hours Study *February 5, 2015*
- NewsPlex.com - Study to Look at Truck Driver Sleep Regulations *January 7, 2016*
- Politifact.com – Can you drive the length of a football field in the time it takes to check a text? *February 15, 2012*

Background

- In 2018, FMCSA identified 2,864 high-risk carriers
- Thousands of other carriers with unsatisfactory safety records
- Companies may be unaware of strategies others have used to successfully improve safety

Objective

- Conduct case studies of carriers that have significantly improved safety performance
  - What strategies were successful?
  - What interventions were not effective?
  - Barriers to implementation?
  - Strategies to overcome barriers?

What did we do?

Identify 9 eligible carriers

In-depth interviews

Content analysis to organize into the Haddon Matrix

Case Studies

What initiated the safety improvement

Timeline for improvement

Safety interventions

Hiring	Training	Safety culture	Safety tech	Dispatch	Vehicle

Carrier Demographics

Carrier	Size	Reason for Improvement	Timeline
A	>1000	Internal benchmarking found safety goals not met.	2012-2018
B	501-1000	Increased crash rates, crash indicator BASIC rose above the 90th percentile.	2018
C	501 - 1000	Internal benchmarking revealed increasing crash rates.	2013-2018
D	101-500	HOS BASIC scores above 90th percentile.	2012-2018
E	101-500	Internal benchmarking identified areas where improvements could be made..	2012-2018
F	51-100	BASIC were close to alert threshold.	2017-2018
G	51-100	Change in carrier ownership, opportunity to start fresh, and high BASIC scores.	2012-2018
H	101-500	Upward trend in crashes, crash indicator BASIC percentile of 92.7	2014-2018
I	<50	Increased trend of smaller crashes and claims, large number of HOS violations	2017-2018

Carrier Safety Improvements

Carrier	Size	Safety Improvement
A	>1000	1) 19.5% reduction in reportable crash rate, 2) 20 percentile improvement in CSA, 3) 56% reduction in rear-ends
B	501-1000	1) 31.7% reduction in reportable crash rate, 2) 70 percentile improvement in CSA
C	501 -1000	1) 75.6% reduction in prevenabltes, 2) 17 percentile improvement in CSA
D	101-500	1) 45 percentile improvement, 2) eliminated all rollovers and rear-ends
E	101-500	1) 35.8% reduction in reportable crashes
F	51-100	1) 66.3% reduction in reportable crash rate, 2) 44 percentile improvement in CSA
G	51-100	1) 26.3% reduction in reportables since 2012, 2) 66.3% reduction since 2017, 3) 38 percentile improvement in CSA
H	101-500	1) 24.4% reduction in reportable crash rate, 2) 39.7 percentile improvement in CSA
I	<50	1) 53.6% reduction in crashes, 2) Zero reportables, 3) 46 percentile improvement in CSA

Key Takeaway #1: Safety Culture

- All 9 carriers indicated the importance of improved safety culture
- All aspects of operations affect safety
  - Who you hire
  - How you train
  - When you train
  - Performance management
  - Routes
  - Dispatch
  - Maintenance

Improving Safety Culture: Driver-Focus

It starts with getting the correct drivers the first time

- Get to know who the applicant is
- Stick to your hiring criteria
- Competitive pay and benefits

Safety training

- Use training to reinforce importance of safety
- Not use for new drivers
- Use of technology (online training, simulators, etc)
- Driver mentor program

Correctable behaviors

Inadequate Scanning

Demonstrating Safe Behaviors

Create Buy-in

Safety culture starts at the top

- "Walk the talk"
- Frequent and consist communication focused on safety
- Address driver comments/concerns
- Share fleet-level safety data

Safety is owned by everyone in the organization – not just drivers

Create family environment

- Concern for safety
- Bring in driver families
- Driver recognition

Driver Accountability

"Other-directed" accountability to "self-directed" accountability

- Encourage and recognize participation
- Consider factors influencing decisions
- SMART goals
- Provide feedback
- "fact-finding" vs. "fault-finding"
- Incorporate driver feedback/suggestions

Key Takeaway #2: Safety Technologies

- 8 of the 9 carriers used technologies to improve
  - AEB, LDW, BSW, telematics, video OBMS
- AEB: 56% reduction in rear-ends; 26.3% reduction in DOT-reportable crashes
- Video monitoring: 53%-66% reduction incidents
- AEB/LDW/video: 31%-36% reduction in DOT-reportable crashes; 75% reduction in preventable incidents

Automatic emergency braking

Lane Departure Warning

Driver Monitoring

Implementing Safety Technologies

Step 1: Determine which technologies address your carrier's needs

- Evaluate the current state of risky driving in your fleet
- Identify the following
  - 3 most frequent risky driving behaviors
  - Other severe risky behaviors
  - Frequency compared to industry
  - Management's response
  - Contributing factors

Evaluate available technologies

- Review currently available technologies
  - What are their capabilities?
  - Capture data on necessary behaviors?
  - Cost?
  - Compatibility with other technologies and software?
  - ROI information?
- Contact vendors
  - Technical/training support?
  - Price reductions?
  - System life span?
  - Ability to customize software?

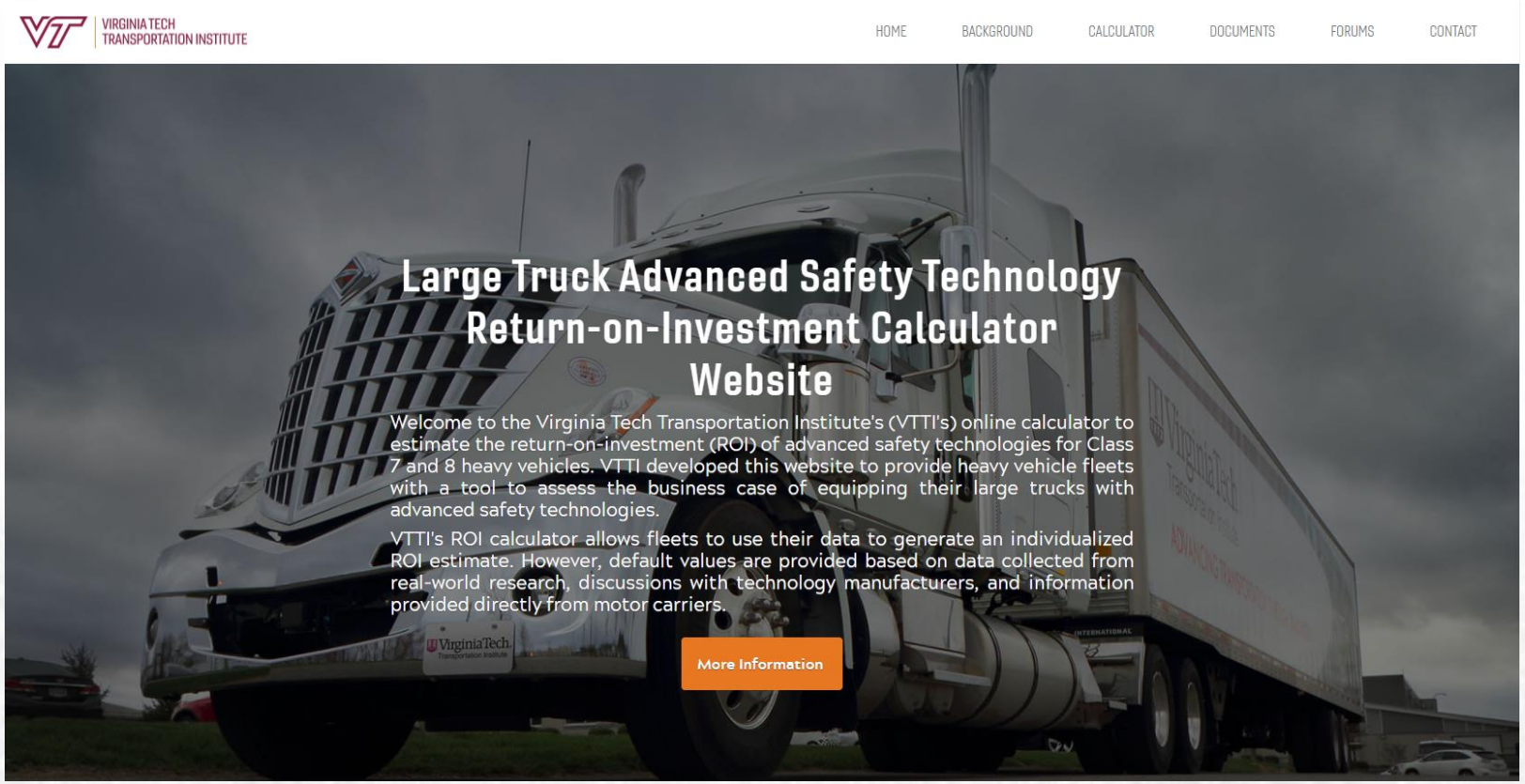
Pilot Test

- Select one or more technologies to pilot test
- Select drivers and trucks
- Perform regular activities and collect data
- Evaluate performance of the technology
  - Drivers' evaluations?
  - Track necessary behaviors?
  - Experience with the vendor/software?
  - Additional services/tools needed?
  - Implementation process?
- Select a technology or test another system

Return on Investment

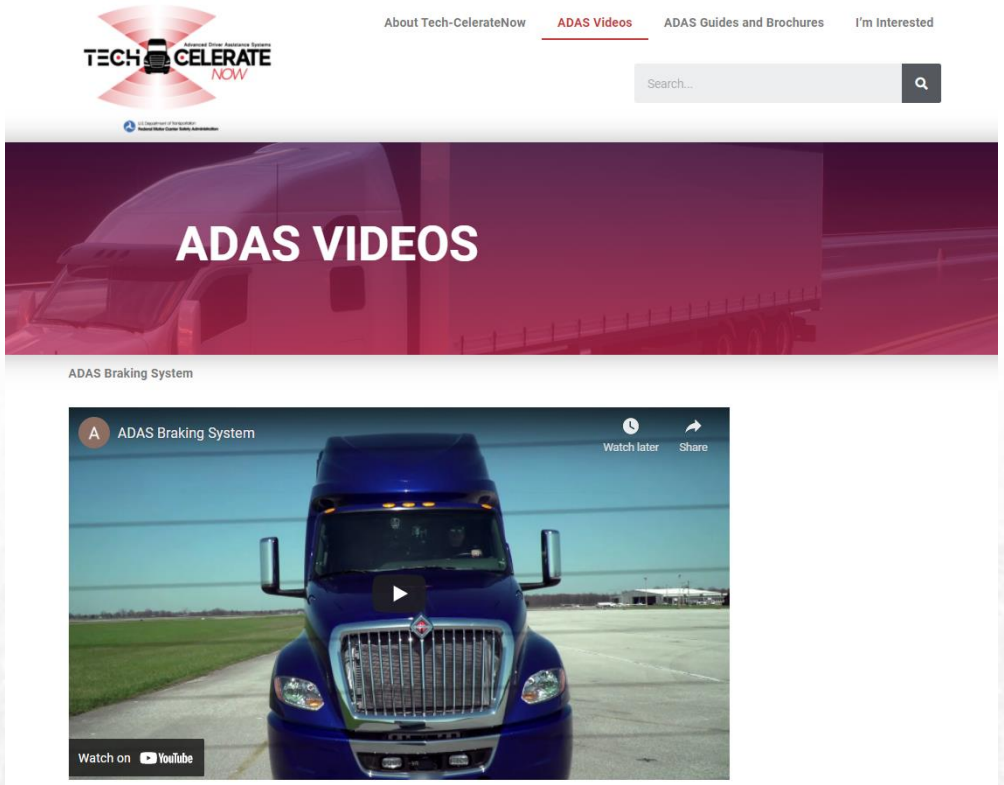
- Each of the fleets indicated a positive ROI
  - Supported by research
- Latest generation of technologies address previous shortcomings
- Zero companies decided to not go for 100% pentration

ADAS ROI Calculations



- www.vtti.vt.edu/roicalculator

Tech-Celerate Now



A Truck Operators' Guide to ADAS

Download

A Return on Investment Guide to ADAS

Download

- www.tech-celeratenow.org

Key Takeaway #3

- Be proactive in addressing driver safety
- 59 of the 69 critical strategies are pre-crash countermeasures
- Focus on correcting behaviors prior to crash
- Preventative maintenance
- Zero tolerance for unsafe scheduling practices

Haddon Matrix Results

	Vehicle	People	Environment	Management Culture
Pre-crash	• AEB • LDW • Blind spot detection • Stability control systems • Speedgauge • Speed limiters • Video-based OSM systems • Monitor wear and tear • Replace parts when issues arise • 24 hour a day maintenance shop • Service tractors before 10,000 miles • Service trailers every 30 days • Inspect truck and trailer each time it returns to facility • Load specific pre-trip checklists	• Participant in FMCSA's pre-employment screening program (PSP) • Require previous driving experience • On-the-job training for all drivers • Finishing program for new drivers • New hire mentoring • Face-to-face interview • Hiring criteria for involvement in previous crashes • Hiring criteria for previous citations and inspections • Past employer referrals • Driver referrals • Driving simulator assessment • Driving simulator training • Online training • Hair drug testing • Physical fitness/agility test • Safety pledge • Monthly or quarterly in-person safety meetings • Coaching sessions based on OSM data	• Visible safety pledge signage in terminals • Plan routes for 45 mph average • Mandatory stops in bad weather • Schedule routes based on individual sleep patterns • Monitoring driving time in real-time	• Non-monetary safety awards • Monetary safety bonuses • Frequency safety communication • Positive, non-confrontational coaching sessions • Open door policy • Full-time trainers to maintain consistent safety message • Management buy-in to safety programs • Zero tolerance for HOS violations • Ownership/top management safety communication • Driver scorecards • Family events • Encourage family involvement in safety • Family culture • Progressive discipline policy • Internal and external safety benchmarking • Share key carrier-wide crash and incident data with drivers • Share carrier-wide safety cost data with drivers • Accountability for safety in all departments • Wellness checks on drivers • Educating all department on their impact on safety • Health and wellness program • Drivers collaborate to develop safety strategies
At scene				• Support driver at scene
Post-crash	• Vehicle repair or replacement	• Post-incident one-on-training • Progressive discipline policy based on crash causes • Health and wellness checks		• Use of video-based OSM to find identify objective data on crash causes • Use of video-based OSM data for driver exonerations • Internal tracking of crashes for data analysis • Internal and external benchmarking • Driver incident reporting system

Key Takeaway #4

- Not one right answer
  - Stick to your policies
  - Choose safety first
- Careful evaluation of your needs
  - Types of crashes/violations
  - Self-reported problems from drivers
  - ASK
- BUT, safety starts at the top

Conclusions

- Consistency across the nine carriers
  - 66.7% indicated creating a strong safety culture played a major role in improved safety
  - 66.7% indicated safety technologies played a major role in improved safety
- Be proactive
- Provided objective data to support safety technologies and improved safety culture
- **Not a single fix to improve safety**

Questions?

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National Safety Council

Thank you!

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