CVO Technologies: Cutting Through the Clutter

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ATRI

Industry’s NFP research organization
- Safety and Human Factors
- Technology
- Environmental Factors
- Economic Analysis
- Transportation Security

- 60%/40% Gov’t/Private Funding
- TRB Executive Committee
- Research Awards: ITSA, ITE, TIDA, TAEC
Freight Industry Snapshot...

- **6 Class 1 railroads; 550 Total**
  - 1.2M freight cars
  - 200K employees
  - 170K miles of track
  - Truck-Rail 2nd fastest growing

- **51 Deep Water Ports; 148 Total**
  - 8000 ships
  - 12K miles of commercial waterways
  - 12M – 20M Containers

- **75% air cargo moved by non-U.S. carriers**
  - Fastest-growing sector over time
  - Expedited: Truck vs. airplane?

- **610,000 Trucking Companies**
  - 10.1M employees; 3.2M truck drivers
  - 2.8 million large trucks; 20M commercial trucks
  - 4.9M trailers
Key Realities

- **Trucking**
  - 6%-7% of GDP
  - Deregulated Twice?
    - HOS/Equipment/Routing/Insurance
  - Highly Competitive
    - 640K Carriers with U.S. DOT; 100K in last 3 years
  - 68% of Tonnage; 86% of Revenue
  - 7% of vehicles; 15.5% of VMTs

- **Fragmented/stratified sectors**
  - LTL/TL/P&D-Courier/HM/Tank/Ag
  - 20 / 80 Rule Applies
Strategic Issues

- Fuel Cost Volatility
  - Jan. ’02 - $1.16/Gallon
  - Oct. ‘04 - $2.20/Gallon
  - Sept. ’05 - $3.02/Gallon
  - May ’06 - $2.89/Gallon
  - March ’07 - $2.79/Gallon
  - Sept ’07 - $2.87/Gallon
  - Oct. ’07 - $3.04/Gallon
  - July ’08 - $4.70/Gallon

- Operating Margins
  - Q1 2007 Average: 3.6%; 1.8% - 5.6%

- Shipper Contracts Dictate Operations/Costs
Safety Realities

- **Fatal Accident Rate Lowest in History**
  - Credit to Industry & Government

- **Fatalities Relatively Stable**
  - Focus of Contentious Debates
  - Outside of HOS, Not Much New

- **There is a Continuum of Good vs Bad Truck Drivers / Carriers**
  - VTTI Figure: 15% / 85%
  - ENS Data: 20% / 80%

- **Major New Research Initiatives Offer Hope?**
  - Quantify Numbers
  - Cost-Benefit Analyses
Safety by the Numbers

2006 Vehicle Fatalities**

- **Total:** 42,642
- **Truck-Involved:** 4,995
- **Responsible Party?**
  - 71% - US DOT
  - 71% - Transport Canada
  - 75% - AAA Foundation
  - 55% - LTCCS

** Keep an Eye on Motorcycles
Onboard Safety Systems
Responsibility-Neutral Solutions

- **OSS has potentially high acceptance**
  - Can address irresponsible 4-wheelers
  - Can address two of the most costly crash types
  - Voluntary versus mandatory?

- **Industry requires…**
  - Carrots / Incentives
  - Information
  - Fast ROI
OSS Research: Data Acquisition Objectives

- Real-world data (versus “societal costs”)
- Crash costs – is someone writing a check?
  - Carrier
  - Insurance company
  - True unit costs
    - NDAs for carriers, insurance, vendors, OEMs
Crash Costs

- **Initial crash cost data**
  - 6 carriers
  - 4 insurers
  - 2 WC firms
  - 3 environmental clean-up firms
  - 2 legal firms

- **Crash data validation**
  - 4 + 6 carriers (12 total in overall process)
  - 2 + 2 insurers (6)
  - 2 + 1 legal firms (3)

- **Financial calculations**
  - 2 economists
  - CPA firm
Benefit-Cost Analysis

Benefits in terms of crash avoidance costs

- **Step 1: Estimate crashes preventable by the technology**
  - Range of technology efficacy (low and high)

- **Step 2: Estimate crash costs for the crashes preventable by the technology**
  - Assumption – self-insured carrier

- **Step 3: Estimate crash costs based on VMT and expected crash reduction**
  - Range: 80,000 – 160,000 VMT
Benefit-Cost Analysis

Technology Costs

- **Step 4: Estimate technology and deployment costs**
  - Assumption – 5 year technology life

Benefit-Cost Analysis Calculations

- **Step 5: Calculate net present values, ROI and payback period**
  - Discount rates of 3% and 7%

Sensitivity Analysis

- Insurance implications
Typical Rear End Crash Costs

- Labor (training, testing, hiring, orientation, recruitment): $7,000
- Workers’ Compensation (medical expense, disability pay, vocational rehabilitation): $62,728
  - Average annual percentage of truck driver injuries per crash: 10%
  - Average annual percentage of truck driver fatalities per fatal crash: 40%

<table>
<thead>
<tr>
<th></th>
<th>Injury Crash</th>
<th>Fatality Crash</th>
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<td>Driver Replacement</td>
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<td>Workers’ Compensation</td>
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Typical Rear End Crash Costs

- Operational: $11,150
  - Cargo damage: $2,500
  - Delivery delays: $750
  - Loading and unloading cargo: $2,500
  - Towing, inventory, storage, miscellaneous: $5,400

- Environmental (fines, clean-up): $14,000

- Property damage to vehicles and surrounding infrastructure: $27,500

- These costs can vary substantially
Typical Rear End Crash Costs

- Court costs and other legal fees
  - Average settlement cost of an injury in a rear-end crash preventable by FCWS is $68,800
    - Average annual number of injuries per injury crash: 1.3
    - Average annual number of injuries per fatal crash: 1.1
  - Average settlement cost of a fatality in a rear-end crash preventable by FCWS is $700,000
    - Average Annual Number of Fatalities per fatal crash: 1

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<td>Out-of-Pocket Costs per Injury</td>
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## Typical Rear End Crash Costs

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<td>$122,650</td>
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FCWS Benefits versus Costs

Assumptions:
- Technology life: 5 years
- Technology cost: $2,000
- Carriers purchasing the technology put 100,000 VMT on trucks with the technology
- Carrier is self-insured and pays all crash costs
- Discount rate = 3%

ROI: For each $1 spent, return is $1.98 at 21% efficacy
Payback period: 26 months
RSC Benefits versus Costs

- **Assumptions:**
  - Technology life: 5 years
  - Technology cost: $1,000
  - Carriers purchasing the technology put 100,000 VMT on trucks with the technology
  - Carrier is self-insured and pays all crash costs
  - Discount rate = 3%

- **ROI:** For each $1 spent, return is $2.33 at 37% efficacy

- **Payback period:** 24 months
LDWS Benefits versus Costs

- Assumptions:
  - Technology Life: 5 years
  - Technology Cost: $1,000
  - Carriers purchasing the technology put 100,000 VMT on trucks with the technology
  - Carrier is self-insured and pays all crash costs
  - Discount Rate = 3%

- ROI: For each $1 spent, return is $1.93 at 23% efficacy

- Payback period: 29 months
EOBR Analysis

Identify primary barriers to industry utilization

- Cost
- Functionalities
- Motor carrier willingness and ability to pay
- Role of non-technical factors
Survey Respondents' Primary Reasons for Not Using EOBRs

Common Docket Responses Opposing an EOBR Mandate Based on the ATRI Analysis

- Cost: 64.0%
- Administrative burden: 20.0%
- Loss productivity: 22.0%
- Driver retention: 24.0%
- Driver privacy concerns: 14.0%
- New unfamiliar technology: 36.0%

- Cost: 50.5%
- Driver privacy: 32.0%
- Truck driver not at fault: 14.0%
- Encourage unsafe driving: 14.9%
- Won't improve safety: 12.2%
- Data security/privacy: 8.1%
Specific Impacts Identified by EOBR Users

- Driver retention: 62%
- Driver morale: 19%
- Company productivity: 76%

Percentage of Respondents:

- Improved: 76%
- No impact: 62%
- Worsened: 9%
- Did not know: 19%
An Alternative Approach to Safety

- Develop targeted safety compliance programs
  - By Carrier?
  - By Sector?

- Program Options: ENS, OSS, EOBRs, DS, Speed Limiters, Fatigue Mgmt Tools

- Alternative Compliance programs could meet minimum rating requirements

- FMCSA could “certify” programs
## Top Industry Issues: 2005 vs 2006

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Top Industry Issues - 2007

1. Hours-of-Service
2. Driver Shortage
3. Fuel Issues
4. **Congestion**
5. Government Regulation
6. Tolls/Highway Funding
7. Tort Reform
8. Truck Driver Training
9. Environmental Issues
10. On-Board Truck Technology
Top Industry Issues – 2008 Preliminary Results (as of 8/11/08)

1. Fuel
2. Economy
3. Driver Shortage
4. HOS
5. Government Regulation
6. Congestion
7. Tolls/Highway Funding
8. Environmental Issues
9. Tort Reform
10. Onboard Truck Technology
Other CVO Research

Productivity

- FPM
- AFCM
- ACE Assessment
- National Trucking Industry Clearinghouse
- Truck Parking Info Systems
- ESCM → EFM → ??
Questions?

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