Combining Behavioral Safety Theory and Telematics

Peter Van Dyne, MA, CSP, CFPS
Don Tolbert, CSP

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Session Objectives

- Examine the challenge of managing performance systematically
- Discuss the synthesis of actionable insights from reliable data
- Explore Telematics as a process data source
- Describe use of Root Cause Analysis for systematic management of aggressive driving events
Elements of Well Performing Fleet Programs

- Select drivers based on their history and ability to perform the job
- Establish and communicate expectations on how jobs should be performed
- Monitor performance against the expectations
- Identify systemic barriers to expected performance
- Adjust systems to support performance expected
- Document actions taken as policy

A Metropolitan Service Fleet...

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The business is known for service excellence</td>
<td>Drivers are told to stay off slick roads</td>
</tr>
<tr>
<td>The drivers are service experts &amp; have regular customers</td>
<td>Postpone service calls until conditions permit</td>
</tr>
<tr>
<td>Bad weather is forecast</td>
<td>“Catch-up” on customer commitments “ASACP”</td>
</tr>
</tbody>
</table>

What Driving Performance Might Result?
People in organizations get *complex* behavioral influence from the systems with which they work.

Behaviors that occur are precisely what the systems support – no more, no less.

**Performance in Organizations**

**What Exists/Comes Before**
- Physical Facilities/Equipment
- Policies/Procedures
- Training/Instructions
- Interactions
- Objectives/Schedules
  
  Provided by Management Systems (Adjustable)

**What is Done**
- Situational Decision Making on What to Do
- Perceived Results
- Action taken
  
  Provided by Workers (Observable)

**What Happens, or not, to Performers**
- Health/Wealth/Status
- Success/Comfort/Energy Expended
- Approval/Acceptance/Affiliation
  
  Provided by Management Systems (Manageable)
Reducing Risk in Complex Systems...*

Old View

Complex Systems are basically safe
The protection comes from

Human Error is a Cause of Accidents

OR

New View

Complex Systems are not basically safe
People have to create safety while negotiating multiple system goals

Human Error is a Symptom of Deeper Issues

“For a long time, people were saying that most accidents were due to human error and this is true in a sense but it’s not very helpful. It’s a bit like saying that falls are due to gravity.”

Dr. Trevor Kletz


Probing Process Failures – What is needed?

- A steady stream of data on their occurrence
- Context for situations in which they occur
- Process for understanding situational contributing factors to them
- Strategies for mitigating contributing factors at their source

Telematics provide continuous, real-time data on driving process failures. More is needed to optimize their value to vehicle fleet operations
Telematics Overview

Information

Connectivity

Intelligence

GPS Satellite

Obtains location information

Cellular Network

Connected Vehicle

Transmits time, location and vehicle information using cellular technology

Telematics Service Provider

Gathers and stores vehicle information to create telematics-based services

Customer / Insured

Uses software to run business for productivity, saving and safety gains
Technology Platforms

- Smart Phone App or App tethered to OBDII
- After Market Hardwired Professionally Installed Devices
- Self Installed OBDII Device
- OEM Built-In Solutions

Telematics Adoption Rate by Industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>Adoption Rate Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>delivery</td>
<td>44% / 56%</td>
</tr>
<tr>
<td>construction</td>
<td>30% / 70%</td>
</tr>
<tr>
<td>government</td>
<td>30% / 70%</td>
</tr>
<tr>
<td>utilities</td>
<td>40% / 60%</td>
</tr>
<tr>
<td>service</td>
<td>37% / 63%</td>
</tr>
<tr>
<td>manufacturing</td>
<td>25% / 75%</td>
</tr>
<tr>
<td>other</td>
<td>41% / 59%</td>
</tr>
</tbody>
</table>

Source: Fleet Management Technology Report by Bobit media publisher of Automotive Fleet Magazine and Government Fleet Magazine
Telematics Adoption by Fleet Size

<table>
<thead>
<tr>
<th>Fleet Size</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-25</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>26-100</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>101-350</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>350+</td>
<td>58%</td>
<td>42%</td>
</tr>
</tbody>
</table>

*Based on 500 survey respondents

Source: Fleet Management Technology Report by Bobit media publisher of Automotive Fleet Magazine and Government Fleet Magazine

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Defining Needs or Objectives for Telematics

- Work productivity
- Fleet management
- Driver performance
- Fuel economy
- Vehicle location
- Security
- Route compliance
Work Productivity

- Map all your vehicles in one view
- Real-time vehicle location and exception reporting
- Route optimization and turn-by-turn directions
- Rerouting with real-time weather and traffic updates
- Customized geo-fencing to identify mapped areas of interest
- Text-to-speech and speech-to-text messaging

Fleet Management

- Engine diagnostics and scheduled maintenance alerts
- Accident notification and emergency services request
- Integration with back-office payroll and accounting systems
- Hours of service reporting
Driver performance

- Driver and fleet level reporting
- Reports with drivers ranked or scored based on performance
- Real-time exception notification of hard braking, swerving, and speeding events
- Customized thresholds for exception notifications
- Seat belt usage information
- Feedback capabilities and coaching modules for drivers and managers

Fuel Economy

- Excessive idling alerts
- Fuel consumption and fuel tank level monitoring
- Speed monitoring (set limits and MPH compared to posted)
Location and Security

- Search feature to find vehicles, drivers or a location
- Stolen vehicle assistance
- Back up battery and data recovery systems

Selecting a vendor

- Identify vendors that can meet your needs/objectives
- Review sample reports to verify they will provide you with tools for employee discussions
- Review the amount of data you will get to avoid being overwhelmed with individual notifications
- Look at scorecards that provide aggressive events per miles driven by driver and fleet
- Look for vendors that will let you test their products prior to buying or entering into a contract
**Aggressive Events**

- Speeding can be measured in multiple ways
- Speed vs. posted limits frequently used
- Harsh acceleration may not tell much about large trucks
- Cornering is measured in G force
- Braking shows rapid speed changes
- Parameters are adjustable (speed and time prior to becoming an event)
- Parameter tolerance should be based on operations and equipment
- Comparing fleets requires similar parameters to provide a valid benchmark

**Compliance vs. Measuring Risk**

- Speed risk from open interstate driving
- Running yellow lights vs. stopping
- Sudden stops can avoid a crash and be a good thing
- Focus on event rates rather than individual events
**Telematics Service Provider (TSP) Scorecards**

- Scorecards can identify aggressive drivers
- Understand the scoring methodology (algorithm)
- A group of aggressive drivers can look average or one average driver can look aggressive depending on the comparisons
- Group like operations and similar vehicles when comparing performance (don’t assume the TSP knows your operation that well)

**Selecting a TSP**

- Identify vendors based on achieving your objective
- Review sample reports to verify they will provide you with tools for employee discussions
- Review the amount of data you will get to avoid being overwhelmed with individual notifications
- Look at scorecards and web sites for ease of use
- Look for aggressive events per miles driven by driver and for the fleet
- Understand event parameters and if they can be adjusted
- Look for vendors that will let you test their products prior to buying or entering into a contract
Calculating Event Rates

- Events per 100 miles common
- Type of event (speed, braking, cornering and acceleration)
- % of time over posted

Event Rate Outliers

- Understand how your equipment works
- Management should have or test devices
- Review the range of event rates
- Compare a driver to the median or middle of the pack driver
- Establish company goals
Aggressive Event Rates - Example 100 Vehicle Fleet

<table>
<thead>
<tr>
<th>Vehicle Number</th>
<th>Event rate per 100 Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle 1</td>
<td>44.5</td>
</tr>
<tr>
<td>Vehicle 2</td>
<td>11.9</td>
</tr>
<tr>
<td>Vehicle 3</td>
<td>9.8</td>
</tr>
<tr>
<td>Vehicle 4</td>
<td>7.5</td>
</tr>
<tr>
<td>Vehicle 5</td>
<td>6.9</td>
</tr>
<tr>
<td>Vehicle 6</td>
<td>6.9</td>
</tr>
<tr>
<td>Vehicle 7</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Root Cause Analysis Group

- Minimum: 0.0
- Maximum: 44.5
- Median: 1.6
- Mean: 2.5

* Minimum rates may include low or zero mile vehicles

Root Cause Analysis for Outliers

- Effectiveness of past coaching discussions and in vehicle observations
- Motor Vehicle Record (MVR)
- Driving Expectations
- Driver Knowledge
- Vehicle and Work Experience
- Fatigue
- Scheduling
- Routing
- Compensation Systems
Root Cause Analysis for Outliers

- Data Integrity/Telematics Device Performance
- Consequences for Performance
- Driver Outside Work Responsibilities/Situations
- Multiple Jobs
- Commuting Times
- On Time Departure at Start Of Work Day
- Distractions
- Vehicle Condition
- Breaks and Lost Time During The Work Day
- Work Flow or Scheduling Exceptions
- Health and Wellness

Setting Company Goals

- Look at the range of performance between drivers
- Understand the average and median scores
- Set realistic company goals for performance
- Use benchmarks from a telematics service provider if they exist
- Develop a plan to improve the drivers most in need of improvement
- Track goals over the course of the year for the company or each location
Developing Individual Action Plans

- Have expectations for the operation of vehicles
- Compare drivers to the median, average and company goals
- Involve supervisors in coaching
- Provide regular feedback
- Avoid distracting the driver while in the vehicle
- Avoid setting unrealistic expectations (“I ran the red light to avoid a hard brake”)
- Develop a culture of friendly competition
- Recognize the very best and use them as an example of what is possible

Process Summary

- Obtain event data and miles
- Calculate event rates
- Identify outliers
- Use root cause analysis
- Track fleet results over time

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Miles</th>
<th>Events</th>
<th>Rate per 100 miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver 1</td>
<td>49.46</td>
<td>22</td>
<td>44.5</td>
</tr>
<tr>
<td>Driver 2</td>
<td>293.7</td>
<td>35</td>
<td>11.9</td>
</tr>
<tr>
<td>Driver 3</td>
<td>10.23</td>
<td>1</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Highest company driver
Middle/average company driver (median not mean)
Lowest company driver

Where does it belong

<table>
<thead>
<tr>
<th></th>
<th>Last Year</th>
<th>This Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.9</td>
<td>2.2</td>
</tr>
</tbody>
</table>