Combining Behavioral Safety Theory and Telematics

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Liberty Mutual INSURANCE

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…

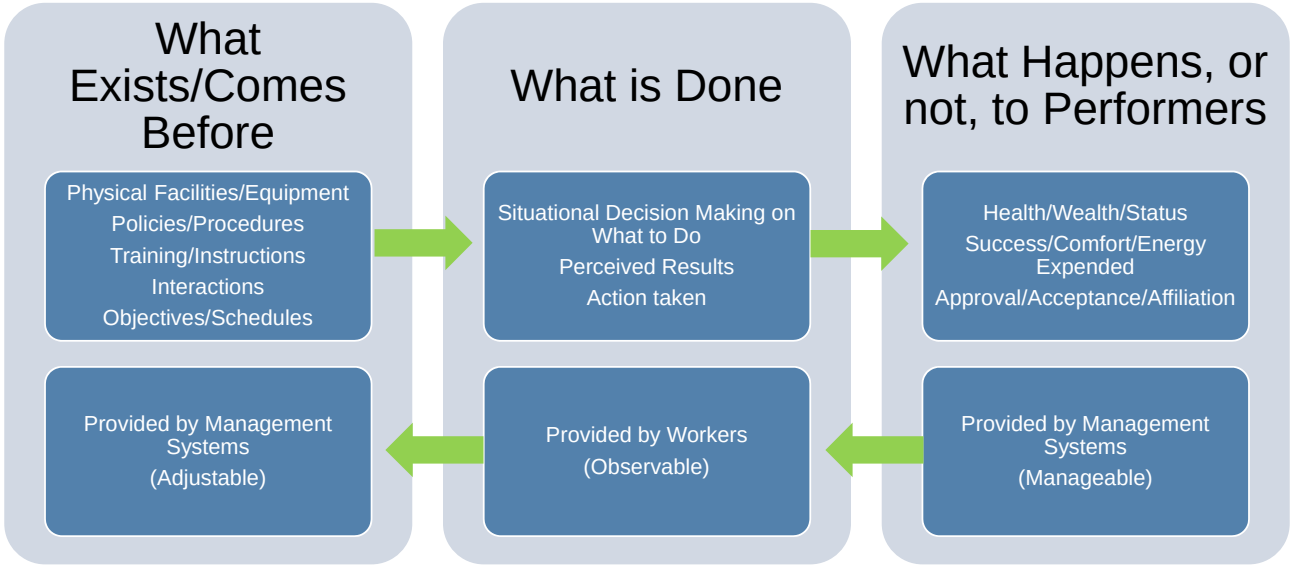
Scenario	Action
▪ The business is known for service excellence ▪ The drivers are service experts & have regular customers ▪ Bad weather is forecast	▪ Drivers are told to stay off slick roads ▪ Postpone service calls until conditions permit ▪ "Catch-up" on customer commitments "ASACP"

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

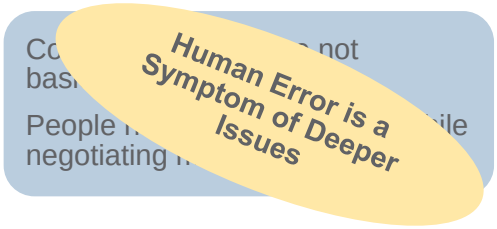


Reducing Risk in Complex Systems…*

Old View

OR

New View



"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."

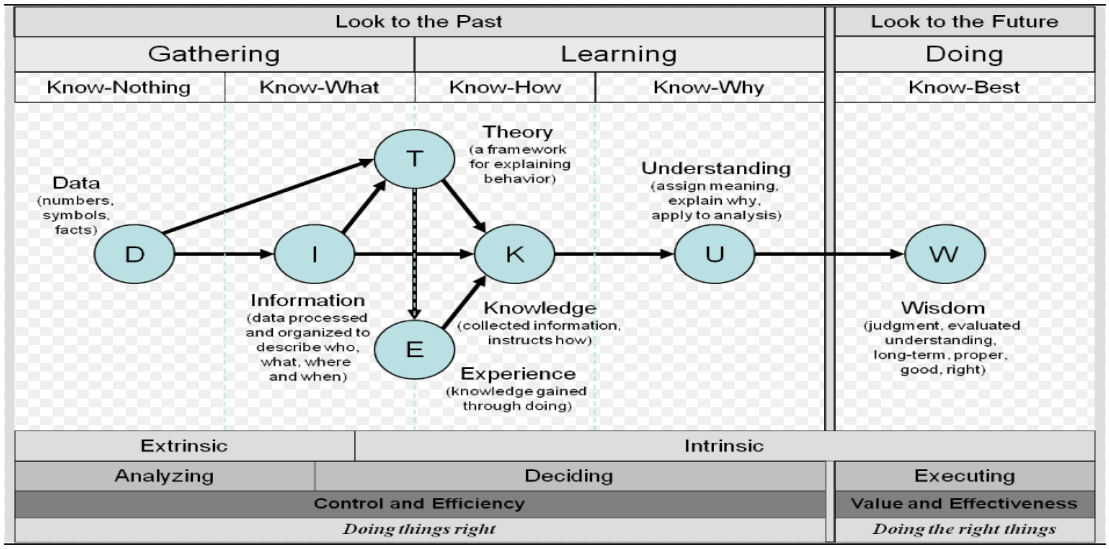
Dr. Trevor Kletz

*Dekker, Sidney; The Field Guide to Human Error Investigations, Ashgate Publishing Company 2002

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

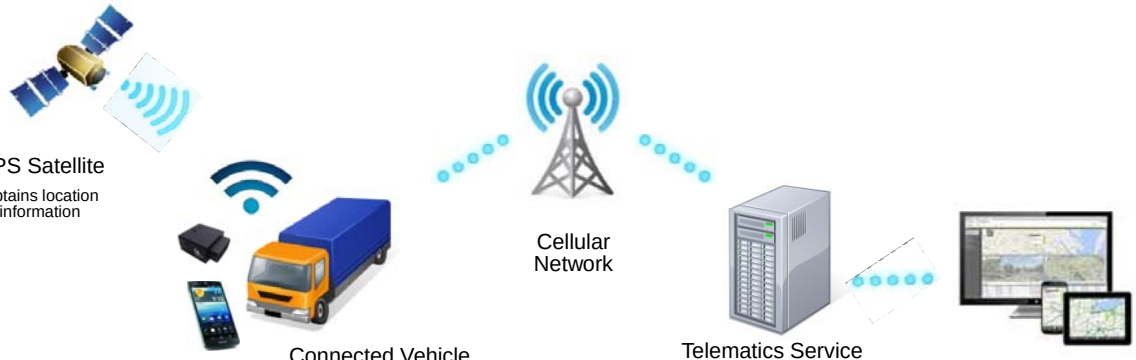


Ackoff, Russell; 1988 Address to International Society for General Systems Research (Proceedings Published 1989)

Graphic Source: http://www.systemswiki.org/index.php?title=Data,_Information,_Knowledge_and_Wisdom

Telematics Overview

Information	Connectivity	Intelligence



GPS Satellite
Obtains location information

Connected Vehicle
Transmits time, location and vehicle information using cellular technology

Cellular Network

Telematics Service Provider
Gathers and stores vehicle information to create telematics-based services

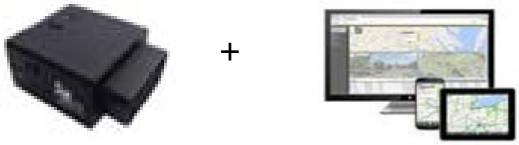
Customer / Insured
Uses software to run business for productivity, saving and safety gains

Technology Platforms

Smart Phone App or App tethered to OBDII

After Market Hardwired Professionally Installed Devices

Self Installed OBDII Device



OEM Built-In Solutions

Liberty Mutual Insurance

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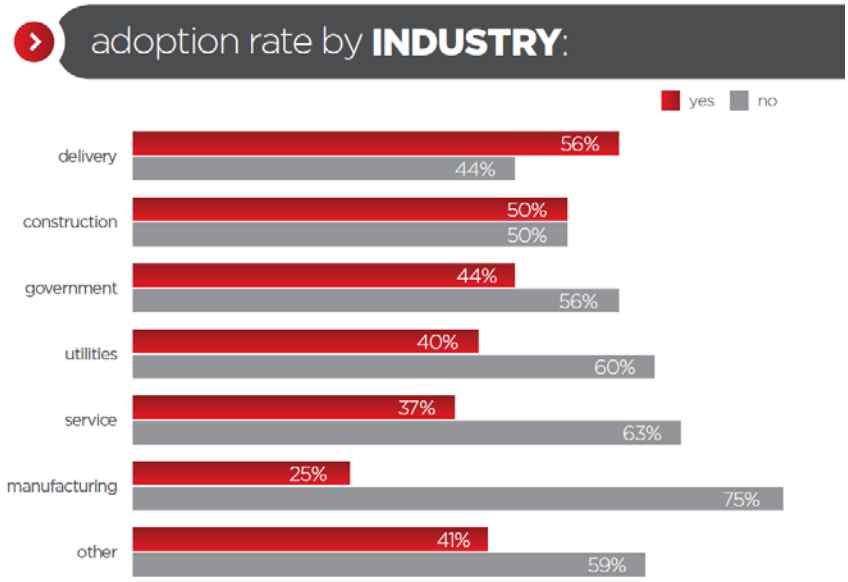
Telematics Adoption Rate by Industry



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

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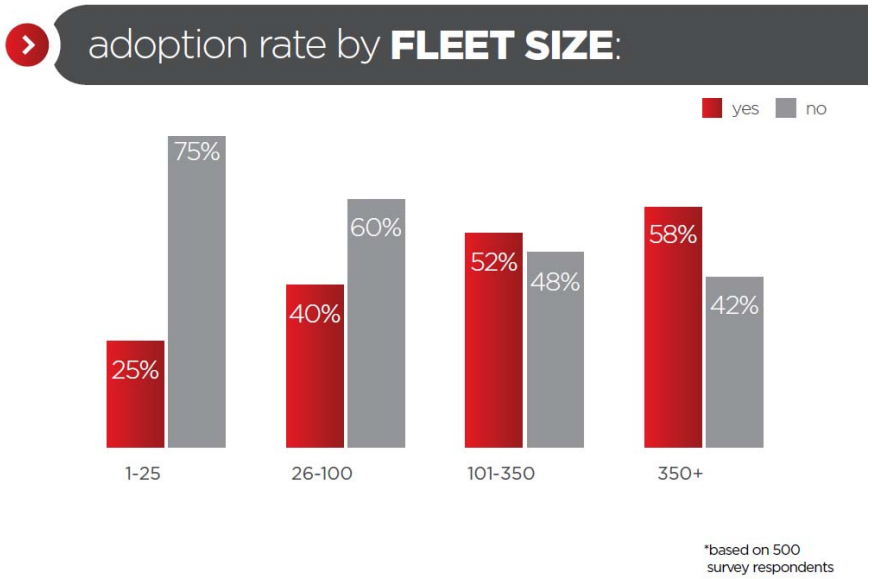
Telematics Adoption by Fleet Size



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

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

Root Cause Analysis Group

Vehicle Number	Event rate per 100 Miles
Vehicle 1	44.5
Vehicle 2	11.9
Vehicle 3	9.8
Vehicle 4	7.5
Vehicle 5	6.9
Vehicle 6	6.9
Vehicle 7	6.6

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

Vehicle	Miles	Events	Rate per 100 miles
Driver 1	49.48	22	44.5
Driver 2	293.7	35	11.9
Driver 3	10.23	1	9.8

Highest company driver

Middle/average company driver (median not mean)

Lowest company driver

Where does it belong

Last Year	This Year
2.9	2.2