Using Telematics Data Effectively

The Nature Of Commercial Fleets

Commitment Beyond Numbers

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About the Presenters

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• SpeedGauge

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• TNEDICCA®
Who?

This is not just a session about big trucks! A fleet is any business with 5 or more vehicles.

We’re PAST the tipping point. Telematics, mobile phones, tablets, ELDs and/or cameras are present in 58% of fleet vehicles! Those who are not leveraging this data will soon realize they are being adversely selected.
The Problem

- PL telematics provide a selection benefit for very homogeneous risks.
- Commercial Lines include a very heterogeneous mix of vehicles and drivers within a single business class.
- Fleet data has exposed the weakness of zone rating heavy vehicles and territory rating light vehicles.
- Driver turnover is up 270%.
- 14% of vehicles are becoming significantly safer every year, but repair costs on replacement vehicles are up 42%.
- We’re not mandating essential ADAS technologies, even though they yield a 61% reduction in frequency.
What’s the Solution?

• The current hard market fuels specialty underwriting, but is fully underwriting everything our new reality?
• We should be looking for higher pass rates based on deep insights and fewer errors!
• Innovate with the self-equipped fleets: >58% have data and 73% are willing to share the data.
• Move away from unit rating/experience rating toward exposure rating.
• Rate the actual vehicle and the driver separately.
• Require an updated driver list quarterly.

<table>
<thead>
<tr>
<th>2018 US &amp; Canada Mkt</th>
<th>&lt;5</th>
<th>5-50</th>
<th>51-500</th>
<th>&gt;500</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Businesses with Vehicles</td>
<td>3,250</td>
<td>920</td>
<td>99</td>
<td>0.9</td>
<td>4,270</td>
</tr>
<tr>
<td>Total Vehicles (millions)</td>
<td>6.1</td>
<td>7.8</td>
<td>5.5</td>
<td>2.9</td>
<td>22</td>
</tr>
<tr>
<td>% Market</td>
<td>27%</td>
<td>35%</td>
<td>25%</td>
<td>13%</td>
<td>100%</td>
</tr>
<tr>
<td>Telematics Equipped (million)</td>
<td>0.4</td>
<td>2.9</td>
<td>3.7</td>
<td>2.6</td>
<td>10</td>
</tr>
<tr>
<td>Telematics Penetration</td>
<td>7%</td>
<td>37%</td>
<td>67%</td>
<td>90%</td>
<td>43%</td>
</tr>
</tbody>
</table>
Comparing different weight vehicles is difficult. Context adds more lift than traditional UBI.
Why Two Scores?

For Commercial Lines, do not accept a single variable as descriptive of the driven exposure. People and vehicles change!

**Driver Score**
Driver score describes the real choices a driver makes every day.

**Vehicle Score**
FAIR Score®, a proprietary exposure index, tells us about the context of the driven risk by VIN.
Misclassification Creates Residual Risk

- Vehicle Scores, combined with detailed driving data, produce a selection benefit 8.5 times more predictive than territory rating.
- Errors in exposure distribution create large rating errors for fleet vehicles, thus creating residual risk.
Residual Risk Captured Through Context

Measuring speeding and braking alone only provides a self-selection benefit!
Building a Contextual Risk Score

- Data was collected from Class 1-8 trucks in seven different programs (included loss sensitive and guaranteed cost clients).
- Geographic area included the lower 48 states.
- All vehicles used telematics.
- Data was normalized by platform and vehicle weight.
- Exposure is based on time on each road segment, not miles.

![Actual Events versus Premium Relativity](image-url)
External Context: Location Risk

Road Modification Effect Example 1: Adding a Turn Lane

After adding the turn lane, did the drivers who usually frequented this location become “safer drivers”? 
External Context: Location Risk

Road Modification Effect Example 2: New Roundabout

After adding the turn lane, did the drivers who usually frequented this location become “worse drivers”?

Source: Analysis from TNEDICCA®
Crash Locations Matter

Process design drives outcomes more than an individual’s behavior. Most traffic crashes consistently occur within a limited set of locations.
From Location Risk to Contextual Risk Score

Demo: https://www.youtube.com/watch?v=2iJmRqB7pco&feature=youtu.be
UBI Score Analysis – Steps to Contextual Analysis

**Analysis**

- **None**
  - Telematics data
  - No associated loss experience

- **Historical Experience**
  - Telematics data
  - Historical loss experience

- **Concurrent Experience**
  - Telematics data
  - Loss cost experience from the same period

**Data**

- **Trip Summary Information**
  - Mileage

- **Indicators**
  - Hard braking
  - Harsh acceleration
  - Speeding

- **Contextual Information**
  - Internal context
  - External context
Putting Telematics Data into Context

Should these trips be evaluated differently?
Data Used for UBI Scoring Analysis

Data Elements

- Heading
- Change in heading (prior 4 readings)
- Speed
- Change in speed (prior 4 readings)
- Feet per second
- Change in feet per second
- Speed limit
- Speed – speed limit
- Speeding indicators (0, 5 and 10 mile buffers)
- Road class
- Hour

Summary Statistics

- 59,000 unique trips (new trip starts when a vehicle is at rest for 60 or more minutes)
- 2.7 million miles
- Trip length average: 2 hours and 15 minutes
- Average distance traveled per trip: 45 miles
- Average mileage per day: 123
• In general, higher speed translates into a worse driving evaluation.
• Many plans use a single speed cut-off.
• In this example, a cut-off of 70 miles or hour results in 3.6% of the readings having a negative evaluation.
Speed Above Limit

- Indicator = 1 for readings where speed is greater than speed limit
- Begins to add some context to the raw speed measure
- Still does not tell the entire story
Speed Minus Speed Limit

- Calculation of speed minus speed limit
- Provides additional context and risk segmentation – takes a single indicator and provides additional segmentation of the risk
Adding Historical Context – Change in Feet per Second
Clustering/Segmentation

• Traditional Analysis
  – Count of braking, speeding, acceleration
  – Application of research studies to traditional data

• Clustering/Segmentation
  – Unsupervised classification technique
  – Groups data into set of discrete clusters or contiguous groups of cases
  – Performs disjoint cluster analysis on the basis of Euclidean distances computed from one or more quantitative input variables and cluster seeds
  – Data points are grouped based on the distances from the seed values
  – Objects in each cluster tend to be similar, objects in different clusters tend to be dissimilar

• Benefit – telematics readings classified based on entire record, not just value of one element
Cluster Distances
Cluster 2 Description

- Average change in feet per second \((t - 1 \text{ to } t - 2)\) = 156
- Average change in feet per second \((t - 2 \text{ to } t - 3)\) = -55

<table>
<thead>
<tr>
<th>Element</th>
<th>Cluster 17</th>
<th>Overall Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway Road Class</td>
<td>45.7%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Time of Day: 12 – 5 am</td>
<td>0.8%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Time of Day: 7 – 8 am</td>
<td>1.0%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Time of Day: 5 – 9 pm</td>
<td>10.5%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Time of Day: 9pm – 12 am</td>
<td>2.2%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
Distance from Cluster Mean

Distance from Cluster Mean

Distribution

Distance from Cluster Mean

Series1 Speeding
Number of Different Clusters Assigned to Each Trip

Number of Behavior Clusters Assigned to Trip

- 0.0%
- 5.0%
- 10.0%
- 15.0%
- 20.0%
- 25.0%
- 30.0%
- 35.0%
- 40.0%

Percentage of Trips

Number of Behavior Clusters Assigned to Trip

0.0%
1.0%
2.0%
3.0%
4.0%
5.0%
6.0%
7.0%
8.0%
9.0%
10.0%
11.0%
12.0%
13.0%
14.0%
15.0%
16.0%
17.0%
18.0%
19.0%
20.0%
21.0%
22.0%
23.0%
24.0%
25.0%
26.0%
27.0%
28.0%
29.0%
The road ahead is clear, despite the picture in the rearview mirror:

- Telematics data isn’t the only way to achieve pricing precision, but it helps!
- Ignoring telematics data limits pricing innovation.
- Much of the premium leakage comes from the what, by whom and how much a vehicle drives.
- Rate each vehicle, and you’ll discover at least 6% of rate.
- Knowing what’s happening on the road ahead is going to prepare you for the future.
Questions
Join Us for the Next APEX Webinar

Tuesday, December 18
2:00 p.m. ET
Registration is Open

Actuarial Standards of Practice (ASOP) Disclosures: A Professionalism Quiz

Laura Maxwell
John Wade
Final Notes

• We’d like your feedback and suggestions
  • Please complete our survey

• For copies of this APEX presentation
  • Visit the Resource Knowledge Center at Pinnacleactuaries.com
Thank You for Your Time and Attention

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