Technology’s Impact on Personal and Commercial Auto Insurance

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About the Presenters

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• Fellow of Casualty Actuarial Society (FCAS)
  • CAS Board of Directors 2015-17
• 2017-18 Captive Power 50
• ICCIE Instructor

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• Bloomington, Illinois
• Pinnacle Actuarial Resources, Inc.
Agenda

• Introduction
• Usage Based Insurance Market Update
• Autonomous Vehicles News
• Commercial Auto
• Conclusion
Usage Based Insurance – Industry Capacity

• Major insurance companies offer some form of usage based insurance (UBI) product

• Strong vendor support
  – Data based scores
  – Variety of implementation offerings
    • Smartphone app
    • Smartphone app with tag
    • On-board device
UBI Score – Increased Sophistication

Established
- Miles
- Time of Day
- Speeding
- Hard Braking
- Hard Acceleration
- Hard Turning

Improvements
- Distracted Driving
- Contextual Data
- Feature Engineering
Distracted Driving – NHTSA Reports

Figure 1
Percent Distribution of Drivers Involved in Fatal Crashes By Age, Distraction, and Cell Phone Use, 2016

Source: FARS 2016 ARF
# Distracted Driving – NHTSA Reports

<table>
<thead>
<tr>
<th>Year</th>
<th>Crash Severity</th>
<th>Overall Crashes</th>
<th>Distraction-Affected Crashes (% of Total Crashes)</th>
<th>D-A Crashes Involving Cell Phone Use (% of D-A Crashes)</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>Fatal Crash</td>
<td>29,867</td>
<td>3,047 (10%)</td>
<td>354 (12%)</td>
</tr>
<tr>
<td></td>
<td>Injury Crash</td>
<td>1,530,000</td>
<td>260,000 (17%)</td>
<td>15,000 (6%)</td>
</tr>
<tr>
<td></td>
<td>PDO* Crash</td>
<td>3,778,000</td>
<td>563,000 (15%)</td>
<td>35,000 (6%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5,338,000</td>
<td>826,000 (15%)</td>
<td>50,000 (6%)</td>
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<tr>
<td>2012</td>
<td>Fatal Crash</td>
<td>31,006</td>
<td>3,088 (10%)</td>
<td>380 (12%)</td>
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<tr>
<td></td>
<td>Injury Crash</td>
<td>1,634,000</td>
<td>286,000 (18%)</td>
<td>21,000 (7%)</td>
</tr>
<tr>
<td></td>
<td>PDO Crash</td>
<td>3,950,000</td>
<td>619,000 (16%)</td>
<td>39,000 (6%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5,615,000</td>
<td>908,000 (16%)</td>
<td>60,000 (7%)</td>
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<tr>
<td>2013</td>
<td>Fatal Crash</td>
<td>30,202</td>
<td>2,923 (10%)</td>
<td>411 (14%)</td>
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<tr>
<td></td>
<td>Injury Crash</td>
<td>1,591,000</td>
<td>284,000 (18%)</td>
<td>24,000 (8%)</td>
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<tr>
<td></td>
<td>PDO Crash</td>
<td>4,066,000</td>
<td>616,000 (15%)</td>
<td>47,000 (8%)</td>
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<tr>
<td></td>
<td>Total</td>
<td>5,687,000</td>
<td>904,000 (16%)</td>
<td>71,000 (8%)</td>
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<tr>
<td>2014</td>
<td>Fatal Crashes</td>
<td>30,056</td>
<td>2,972 (10%)</td>
<td>387 (13%)</td>
</tr>
<tr>
<td></td>
<td>Injury Crash</td>
<td>1,648,000</td>
<td>297,000 (18%)</td>
<td>22,000 (8%)</td>
</tr>
<tr>
<td></td>
<td>PDO Crash</td>
<td>4,387,000</td>
<td>667,000 (15%)</td>
<td>46,000 (7%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6,064,000</td>
<td>967,000 (16%)</td>
<td>69,000 (7%)</td>
</tr>
<tr>
<td>2015</td>
<td>Fatal Crashes</td>
<td>32,166</td>
<td>3,196 (10%)</td>
<td>442 (14%)</td>
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<tr>
<td></td>
<td>Injury Crash</td>
<td>1,715,000</td>
<td>265,000 (15%)</td>
<td>21,000 (8%)</td>
</tr>
<tr>
<td></td>
<td>PDO Crash</td>
<td>4,548,000</td>
<td>617,000 (14%)</td>
<td>48,000 (8%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6,296,000</td>
<td>885,000 (14%)</td>
<td>69,000 (8%)</td>
</tr>
</tbody>
</table>

*PDO – Property Damage Only

More Numbers on Distracted Driving

• 2018 Travelers Risk Index Distracted Driving Infographic
  – 85% say driving while using personal technology is extremely risky
  – 25% of people who say they engage in distracted driving believe they can do so safely

• Esurance survey results
  – 58% of drivers admitted to occasional or frequent distracted driving
  – those who admit to driving distracted are 36% less likely to be “very concerned” about the issue than those who claim to be “rarely distracted”

https://www.travelers.com/resources/risk-index/2018-distracted-driving-infographic
https://www.esurance.com/insights/technology-and-distracted-driving
Snapshot – Customer Reaction

Progressive Snapshot - Customers with Negative Reactions

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>67.7%</td>
</tr>
<tr>
<td>2015</td>
<td>81.8%</td>
</tr>
<tr>
<td>2016</td>
<td>82.0%</td>
</tr>
<tr>
<td>2017</td>
<td>82.5%</td>
</tr>
<tr>
<td>2018</td>
<td>80.1%</td>
</tr>
</tbody>
</table>

Top 4 Customer Complaints

- Battery: 4.5%
- Beeping: 14.1%
- Savings: 16.3%
- Beeping: 21.6%

- Positive
  - Savings
    - Significant
    - Consistent with expectations
  - Recommendations
    - Saved money
    - Service
  - Driving evaluation
Allstate and State Farm – Customer Reaction

Allstate - Drivewise

- 2017: 80%
- 2018: 70%
- 2017: 20%
- 2018: 30%

State Farm Drive Safe and Save

- 2017: 87%
- 2018: 69%
- 2017: 13%
- 2018: 31%
MetroMile – Customer Reaction

Negative Reactions
• Customer service
• Rates going up
• Vehicle issues
• Device fulfillment
Root and HiRoad – Positive Reaction

**Root Insurance**
- Positive: 86%
- Negative: 14%

**HiRoad Insurance**
- "driving is to a society what steps are to the individual.... HiRoad aims to do for driving what step counting did for wellness"
- @HiRoadInsurance
There are fundamental challenges associated with incorporating UBI into a traditional insurance process that UBI-only companies have not faced.

Progressive is the only traditional insurance company that has been successful with consumer adoption.

None of the traditional companies have been successful with customer satisfaction.

UBI-only companies are growing.

MetroMile has experienced some of the same negative reactions as the traditional insurance companies.

Root and HiRoad have high customer satisfaction scores – can this be maintained as they grow and mature?

Key building blocks: customer experience, customer service, savings, expectation management.
The Bottom Line

- Despite high UBI availability, currently only 5% of Americans use UBI.
  - Business Models
  - Consumers
  - Companies
  - Agents

Tesla in the News

Elon Musk's tweets investigated for possibly breaking law: reports

SEC is reportedly investigating whether the Tesla CEO's tweets about going private may have violated US securities law

Elon Musk teases electric plane design and smokes weed on Joe Rogan podcast

The Verge

13 hours ago

Tesla's chief accounting officer quit after concluding Elon Musk and others weren't...

CNBC.com

3 hours ago

Elon Musk Said Buying His Flamethrower Was A "Terrible Idea"

Wochit News

YouTube - 8 hours ago

Tesla continues to make news.
Tesla Progress Continues

The electric automaker continues to work to convert itself from a money-losing boutique to a mass-production profit machine.
Teardown and analysis of a Tesla Model 3

- Inconsistent gaps and flushness
- Missing bolts
- Loose tolerances
- Uneven and misaligned spot welds

Model 3 quality issues are still prominent in reviews by owners but that doesn’t diminish their love of the car

14,450 BMWs

20,450 Tesla Model 3s
Utilization of Over the Air Improvements

- Consumer Reports now recommends the Tesla Model 3, after testers found that a recent over-the-air (OTA) update improved the car’s braking distance by almost 20 feet.
- Tesla plans to release Autopilot ‘On Ramp/Off Ramp’ feature in version 9.0 update in September

Studies show that Unfamiliar Passenger Car Drivers (those with less than 1,000 miles of experience in a vehicle) account for 17-24% of all drivers in crashes.
Tesla Model S Study Findings

- Highway Loss Data Institute (HLDI) studies on the Tesla Model S
  - The combined driver assistance features
    - Lowered the frequency of property damage liability (PDL) claims by 11 percent
    - Lowered the frequency of bodily injury (BI) liability claims by 21 percent
  - Enabling the Autopilot feature
    - Did not change the frequency of claims filed under PDL, BI, MedPay and PIP
    - Lowered the frequency of collision claims by 13 percent

- The Model S had higher claim frequencies, higher claim severities and higher overall losses than other large luxury cars.
### SAE and the 5 Levels of Autonomy

#### Society of Automotive Engineers (SAE) Automation Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0     | **No Automation**  
Zero autonomy; the driver performs all driving tasks. |
| 1     | **Driver Assistance**  
Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design. |
| 2     | **Partial Automation**  
Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times. |
| 3     | **Conditional Automation**  
Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice. |
| 4     | **High Automation**  
The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle. |
| 5     | **Full Automation**  
The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle. |
Tesla and Waymo – Differing Approaches?

• Waymo – designing self-driving from the ground up
  – No vehicle sales yet
  – Gather high-resolution maps of the areas where it's operating
  – The company can do this one city at a time

• Tesla – pushing advances one version at a time
  – Vehicles nationwide
  – Feature advances one version at a time
  – Local improvements may lead to adverse customer response
Driver-Assistance Technologies

- Advanced crash avoidance features are here
  - Front crash prevention
  - Lane departure warning
  - Blind spot detection
  - Park assist
  - Rear crash prevention
Insurance Institute for Highway Safety (IIHS) Studies

- **Forward Collision Warning**
  - 27% Front-to-rear crashes
  - 20% Front-to-rear crashes with injuries
  - 9% Claim rates for damage to other vehicles
  - 16% Claim rates for injuries to people in other vehicles

- **Forward Collision Warning plus Autobrake**
  - 50% Front-to-rear crashes
  - 56% Front-to-rear crashes with injuries
  - 13% Claim rates for damage to other vehicles
  - 23% Claim rates for injuries to people in other vehicles

- **Lane Departure Warning**
  - 11% Single-vehicle, sideswipe and head-on crashes
  - 21% Injury crashes of the same types

- **Blind Spot Detection**
  - 14% Lane-change crashes
  - 23% Lane-change crashes with injuries
  - 7% Claim rates for damage to other vehicles
  - 8% Claim rates for injuries to people in other vehicles

- **Rear Automatic Braking**
  - 62% Backing crashes
  - 12% Claim rates for damage to the insured vehicle
  - 30% Claim rates for damage to other vehicles
From iPhone to iCar (Recent Apple Patents)

• Comfort Profiles (US 2018/0208209 A1)
  – Filed 9/7/2016, Awarded 7/26/2018

• Autonomous Navigation System (US 2017/0363430 A1)
  – Filed 12/4/2015, Awarded 12/21/2017

• System and Method for Visual Communication of an Operational Status (US 10,053,001 B1)
  – Filed 9/15/2016, Awarded 8/21/2018
Visual Communication

FIG. 5
For The Next 3 Miles

FIG. 6
OBSTRUCTION AHEAD! THIS LANE

FIG. 7

FIG. 8
The First Apple Accident

- Apple Self-Driving Car Rear Ended During Road Testing
  - Event occurrence 8/24/2018
  - Rear-ended while merging onto expressway

https://www.reuters.com/article/us-apple-autos/apple-self-driving-car-rear-ended-during-road-testing-idUSKCN1LG2X1
## CA DMV Permits for Autonomous Vehicles

<table>
<thead>
<tr>
<th>Company</th>
<th>Vehicles</th>
<th>Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM Cruise</td>
<td>175</td>
<td>467</td>
</tr>
<tr>
<td>Waymo</td>
<td>88</td>
<td>415</td>
</tr>
<tr>
<td>Apple</td>
<td>70</td>
<td>139</td>
</tr>
<tr>
<td>Tesla</td>
<td>39</td>
<td>92</td>
</tr>
<tr>
<td><strong>Total (57)</strong></td>
<td><strong>556</strong></td>
<td><strong>1,917</strong></td>
</tr>
</tbody>
</table>

The Bottom Line on Autonomous Vehicles

- True autonomous vehicles (level 4/5 on the SAE scale) are still a distant disruption
  - Monitor intermediate enhancements
  - Proactive assessment of impact, both direct and indirect
Commercial Automobile - AM Best
Frequency/Severity Trends

Bodily Injury Crashes Involving Large Trucks or Buses
Federal Motor Carrier Safety Administration (FMCSA)

Crashes per Million Miles


Crashes per Million Miles
Comments from AM Best

Deteriorating Commercial Automobile Performance Continues To Hinder Profitability of Overall P/C Market

• “Recent rate increases have been insufficient in an attempt at playing catch up.”
• “The cause of the worsening automobile results appears to include both escalating...claim frequency and severity.”
• Economic recovery (increased miles per vehicle), traffic density, driver shortages, distracted driving, and new vehicle purchases are also cited.
Collision Avoidance Systems

- Examples – Bendix Wingman, Meritor On Guard
- Radar based
- Adaptive cruise control
- Crash warning system
- Collision mitigation system
Roll Stability Control

- Examples – Omnitracs Roll Stability, Meritor RSS
- Anti-lock Brakes
- Automatic Traction Control
- Electronic Stability Control
- Products Focused on Trailer Stability
Lane Departure Warning System

• Example – Bendix Lane Departure System
• Lane departures are more expensive in trucks than personal autos
• Similar to personal auto systems
• Distinctive “rumble strip” warning that alerts, without distracting
• Rewards safe driving behavior
• Provides targeted training opportunities
• Information to home office (insurer or carrier risk management)
Event Recording Cameras

• Example – DriveCam, SmartDrive
• Captures video (forward, rear, interior available) 10 seconds before and after an event
• Abrupt speed change, lane change, etc.
• Video transmitted to company risk management
• Tremendous claims tool
Wearables

- Smartwatches are gaining market share
- Driver Performance
- Safety and Security
- Driver Health and Fitness
- Supplement to Smart Phones
- Hands free access to data
  - e.g. Route updates
- Vibration can get attention without distracting
- 911 enabled
- Many apps are smart watch enabled
Impact

• In a review of a major trucking insurance program, the use of dash cams or crash avoidance systems reduced claims costs by more than 30%.
• Trucking companies that used both cams and crash avoidance systems had claims costs of about 50% of carriers that used neither.
Where are we headed?

• Do we have enough data for trucking insurance to be commoditized by:
  – Load type – grain, chemicals, new cars, etc.
  – Driver/Carrier – historical experience, current safety and loss control tools
  – Route – Traffic density, weather, overall riskiness of roads (climbs, turns, etc.)

• Can a more expansive costing tool for a load that goes beyond insurance to include wait times, fuel costs, and other elements be developed?
Questions
Join Us for the Next APEX Webinar

Thursday, September 27
2:00 p.m. ET
Registration is Open

Loss Reserving 201
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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