

Automobile Insurance: the times, they are a changin'

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How will the new cars change the insurance industry?

- Focus today on AVs and ADAS
- What are they?
- When are they coming?
- How will they change our industry?
- How will they change our world?

What are They?

- AV means autonomous vehicle
- ADAS is advanced driver assistance systems

ADAS

- Are systems in a number of new cars that assist driver's with various tasks.
- They include:
 - CMBS – collision mitigation braking system
 - AEB – auto emergency braking
 - LKAS – Lane Keep Assist System (lane departure warning)
 - Blind spot warning system
 - Adaptive headlights
 - Rear-view cameras

Warnings versus Actions

- A system can warn you of a problem or do something about the problem.
- Example:
 - Warning system (LDW) warns you that you are wandering out of your lane; or
 - LKAS system steers the car back into the centre of the lane when it detects the car wandering out of the lane.

Impact of Warning Systems

- Systems that warned of impending rear end collisions reduced damage claims by 23% but did not reduce injuries significantly.
- This probably results from the fact they can be ignored and turned off.
- Also the automated systems are actually better at stopping the car than people are.

Anticipated Impact of ADAS

- IIHS in 2012 expected cars equipped with CMBS, lane departure warnings, blind spot detection and adaptive headlights to reduce accident rates by 1/3.
- At that time CMBS reduced accidents by 14%, adaptive headlights by 5-10% (night driving only 7% of reported crashes) and lane departure warning increased accident rates (not statistically significant).

CMBS and AEB

- 2012 Study of IIHS showed these systems reduced rear end collisions by 39% and rear collisions with injuries by 42%.
- Overall crash reduction of 12% and injury reduction of 15%.
- This suggests that about 30% of all crashes are rear end ones and 35% of all injuries arise from rear end collisions.

CMBS and AEB

- This means that these system will reduce injury claims by 1/3.
- These are not even AVs or self-driving cars.

CMBS and Lane Departure

- 2014 study of Honda's equipped with CMBS and lane departure warnings reduced damage claims to other cars by 14%, injuries to occupants by 27% and injuries to other users of the road by 40%
- CMBS could be standard equipment by 2022

Rear View Cameras

- Rear view cameras reduce crashes when backing by 16% according to a 2016 IIHS study.
- For drivers over 70 the reduction was 40%.
- A number of systems also have cross traffic warnings.
- These are warning systems. Those vehicles with automatic braking should reduce accidents even further.

Electronic Stability Control

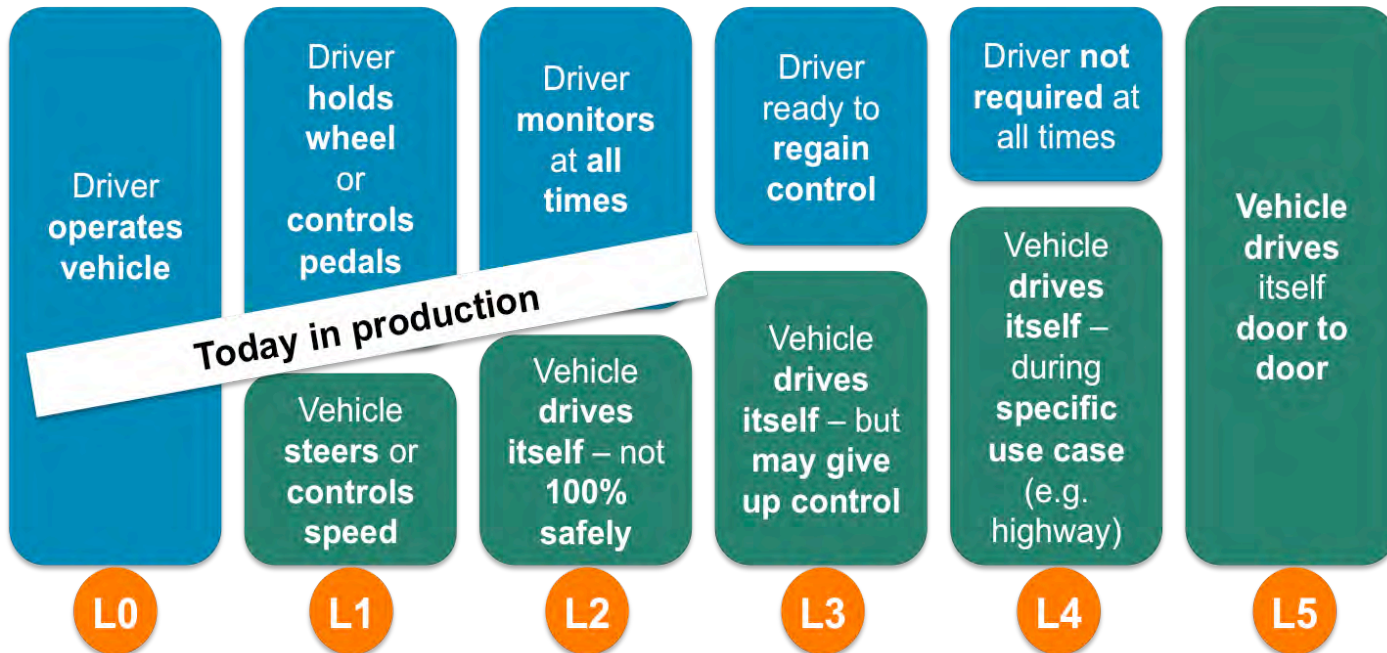
- Reduces single car fatal crashes by 38% and 56% for SUVs.

Driver Behaviour

- People can be annoyed by warnings and some are turned off.
- However, a 2014 study of the IIHS found that warning systems neither encouraged or discouraged drivers from engaging in distracted driving behaviours.

Autonomous Vehicles

- There is a spectrum from vehicles operated solely by the driver to vehicles which are completely self driving.



AUTOMATION LEVELS OF AUTONOMOUS CARS

LEVEL 0



There are no autonomous features.

LEVEL 1



These cars can handle one task at a time, like automatic braking.

LEVEL 2



These cars would have at least two automated functions.

LEVEL 3



These cars handle "dynamic driving tasks" but might still need intervention.

LEVEL 4



These cars are officially driverless in certain environments.

LEVEL 5



These cars can operate entirely on their own without any driver presence.

US Automation Levels

- Situation is confused by fact that until late last year US NHTSA (National Highway Traffic Safety Association) used a 5 level scale that ran from 0 to 4 with a fully self-driving car being level 4. They have now adopted the SAE approach.
- As a result you will often read US publications that refer to a driverless car as having level 4 automation.

Tesla

- Tesla has had autopilot (self-driving feature) in its vehicles as an option since 2015.
- Due to risky behaviour by drivers (not paying attention when using autopilot) it removed some self-driving features in 2015.
- Version 7.1 software can park and unpark vehicle without a driver.

Tesla

- Version 8 software uses radar as main sensor and can sometimes see car ahead of car ahead.
- It can navigate in low visibility.
- System modified last November to require more frequent touching of wheel by driver.
- Over 500 million km on hardware version 1 in active mode and 2 billion km in shadow mode.

Tesla

- Version 2 of hardware rolled out this year.
- Has adaptive cruise control and a limited version of autosteer which was enabled only for divided highways originally.
- Starting in February autosteer available up to 35 mph and on local roads.
- Hardware one is camera (looking forward) and acoustic location sensors in both bumpers.

Tesla

- It can detect road signs, lane markings, obstacles and other vehicles.
- Hardware 2 should allow full SAE self driving Level 5 by end of 2017.
- 8 surround cameras, 12 ultrasonic sensors, forward facing radar.
- Cost is \$8,000 US.

Roll-out

- Tesla intends to have self-driving available this year or next.
- Ford plans to roll out a fleet of self-driving vehicles with no steering wheels or pedals by 2021.

Problems with Levels 2 and 3

- Drivers who have assist systems tend to fall asleep at the wheel or fail to pay attention.
- This can lead to accidents and may encourage companies to go to level 5 too early.
- Good example is Tesla that hit the tractor trailer.
- Neither the driver or car saw the trailer but the driver had 7 full seconds to perceive it so Tesla was cleared.
- He was watching a Harry Potter movie.

Mixture of Levels

- Unclear if having vehicles from levels 0 to 5 on the road at the same time is a good idea.
- Difficult to see doing it differently because many drivers cannot afford level 5 vehicles.

Current Situation

- Level 4 vehicles already exist for example in mining.
- With dedicated lanes level 4 vehicles could probably be used in mass transit systems at the present time.
- Some have suggested that truck fleets maybe level 5 before passenger cars.

Legal Liability

- Currently liability is tied to the driver and to the lessor and owner on a vicarious basis by statute.
- This model works up to level 3 but becomes problematic at levels 4 and 5.
- Volvo indicated in 2015 that it will assume all legal liability for self-driving car crashes.

Legal Liability

- Rules may change holding manufacturers or distributors liable for level 4 cars, when driving autonomously, and level 5 cars at all time.
- If we allow drivers to have control at times, then drivers and owners will continue to need their own insurance.
- One might be able to only purchase comprehensive coverage if they agreed to never drive.

Legal Liability

- If we do not allow human driving, then personal lines coverage is likely unnecessary and a handful of insurers will insure manufacturers.
- What about systems that get hacked by third parties or by owners who wish to change the programming.
- Owners might like to change the vehicle's decisions in an unavoidable crash situation.

Legal Liability

- Unless the accident rates drop significantly (some have projected 90%), then is the risk assumed by manufacturers sustainable.
- What about crashes involving Level 5 and vehicles under driver control?
- Will there be a push for no-fault particularly given the problem with mixed level vehicles on the roads? Will it be based on a market share model? What about situations like Takata?

Other Impacts

- Whoever insures vehicles it is clear that accident rates should drop going forward. Volvo has indicated that no one should be injured or killed in its vehicles by 2020.
- In 2016 one major Canadian insurer's book was 54% auto.
- What will be left of that in 10 years?
- What will replace it?

Other Impacts

- Who will repair vehicles? If manufacturers assume liability will they insist on repairing and servicing all vehicles?

Other impacts

- In 2011 almost 4% of men in Canada were employed as transport drivers and delivery or courier drivers. That is over 335,000 of your customers.
- What is going to happen to them? Who will be your clients in 2025?

The self-driving vehicle revolution

An illustration of potential growth



Era 1:

Fully autonomous vehicles (AVs) being developed for consumers

- 1 AVs are already a reality in industrial fleets
- 2 Car OEMs begin to assess strategic impact
- 3 New mobility models begin to emerge

Era 2:

Consumers begin to adopt AVs

- 4 The after-sales service landscape is reshaped
- 5 Insurers shift from covering individuals to covering technical failures
- 6 Supply chain and logistics are redefined

Era 3:

AVs become the primary means of transport

- 7 AVs free up to 50 minutes a day for drivers
- 8 Parking space is reduced by billions of square meters
- 9 Vehicle crashes fall by 90%, saving billions of dollars
- 10 AV technology accelerates development of robots for consumer use

Slow Down!

- None of this may happen this fast.
- Steven Shladover in a 2016 article in Scientific American discusses in detail the challenges to develop a level 5 vehicle.
- For example, he points out that it is much easier to develop an autopilot for an aircraft which rarely encounters other aircraft and has multiple seconds rather than tenths of a second to react.