EMERGING TRENDS IN TRANSPORTATION

AIMU
MARINE INSURANCE DAY

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What We'll Cover Today

- From empty gas stations … to a shortage of manufactured goods… to a backlog of ships at ports… replacing humans with machines over time seems increasingly probable
- But is it realistic for the transportation industry… and how quickly will it occur?
- What other things should keep a marine insurance professional up at night?

Here's what we'll cover today:

- How will semi-autonomous trucks cope with current state of US infrastructure
- How do semi-autonomous trucks work
- How can semi-autonomous trucks combat the current driver shortage
- What's the impact on the trucking industry's bottom line
- How will this affect transportation Insurance
- Telematics
- New Challenges

But first…

let me explain….

Inland Marine Transportation Insurance

- Transportation: one of the largest lines of inland marine insurance
- We don't insure the trucks – we insure the goods inside the trucks
- Motor Truck Cargo coverage indemnifies the carrier for hire for covered loss to *property of others* in their care, custody or control
- Shipper's Interest coverage indemnifies the consignor (or consignee) for loss or damage to *their* property
- **Example: If your property get damaged or stolen in transit, you'll make a claim against the carrier for hire or against your Shipper's Interest policy. The carrier for hire will make a claim against their MTC policy.**

Infrastructure Challenges

What grade would you give the quality of roads in the US?

- A
- B-
- C-
- D
- F

Money and Political Will

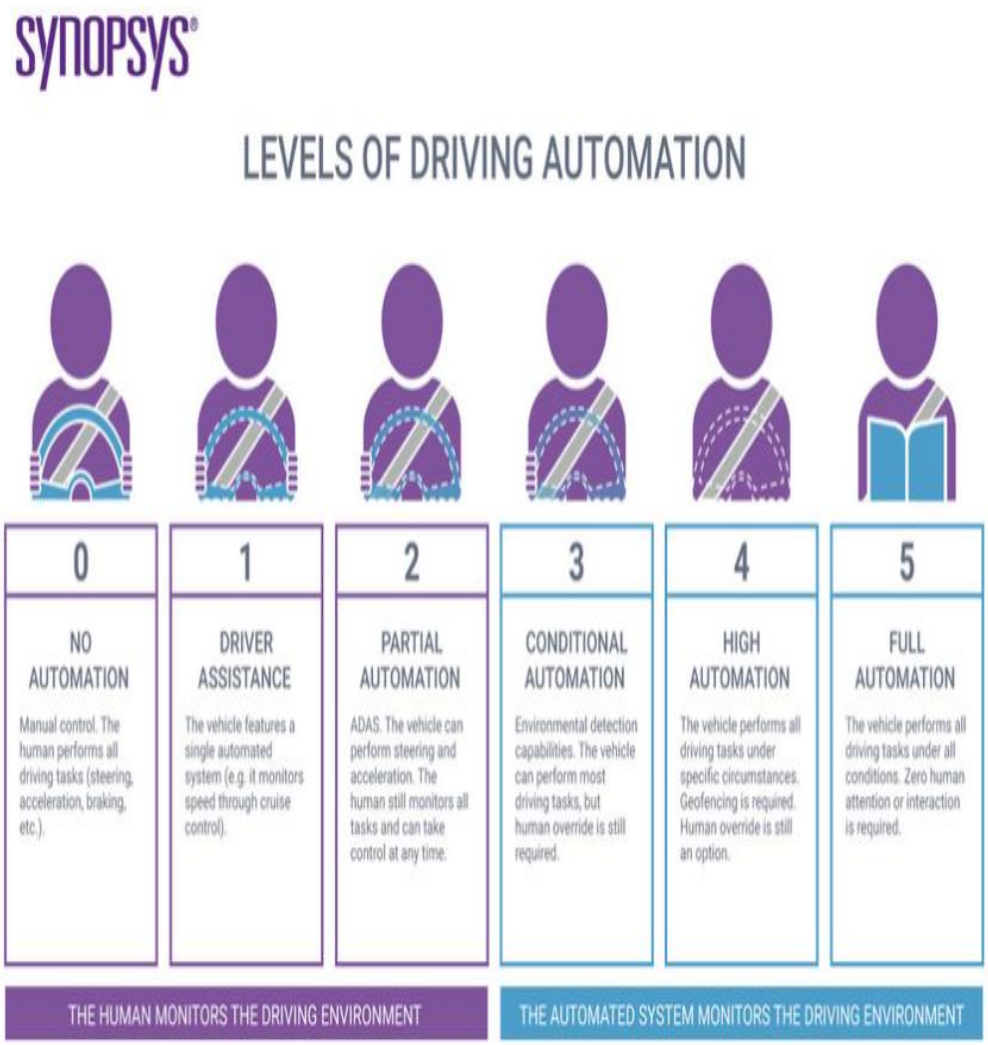
- Bad roads make it harder to adopt driverless technology
- 40% of US roads are in poor or mediocre condition
- 3m miles of paved roads have poor markings and uneven signage
- $786b backlog of road and bridge capital needs
- Government hasn't passed a significant infrastructure bill
- US road quality is ranked 13th in the World
- *Driverless technology companies will adapt, but at a greater cost*

Source: World Economic Form American Society of Civil Engineers

Technology

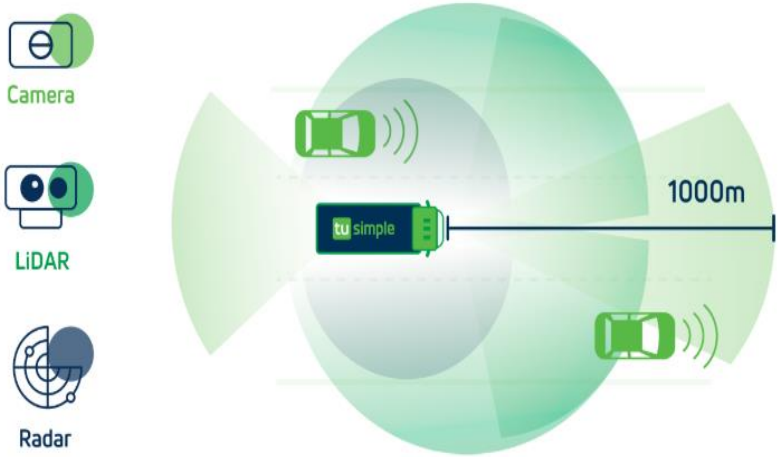
How It Works

- Utilizes radar sensors, cameras, and LiDAR (light in the form of a pulsed laser to measure ranges to the Earth) to detect objects and lane markings around the truck in order to take over steering, breaking, and acceleration functions
- Adaptive cruise control keeps the truck the right distance from the vehicle in front of it - can come to a complete stop if necessary
- **Uses a GPS-based autopilot system accurate to up to 5 centimeters**
- Can operate autonomously on a preprogrammed course that had been “mapped” by other autonomous vehicles



“Seeing” Is Believing

- Trucks require a lot more distance to stop than a car; you need to be able to see well beyond a car’s emergency stopping distance, which is ~300-feet
- Cameras can sense objects farther away than LiDAR and Radar
- Cameras have different sensitivities - bright light, dim light, nighttime, and near-infrared as well
- TuSimple’s trucks have on average 10 cameras installed, and are still equipped with LiDAR and Radar
- Short video of how it works (start at 0:47; end at 3:31)



Source: Truck News

Platooning

- One or more trucks follow the lead truck in a very tight formation at highway speeds
  - ***Can ease congested roads***
- Uses vehicle-to-vehicle communications, adaptive cruise control, collision avoidance systems, radar and GPS data
- Trucks constantly maintain a communication link
- 5-10% reduction in fuel cost

Source: Automotive World

Here Already

- Working with a startup called Gatik, Walmart will use fully autonomous **box trucks** to make deliveries in Arkansas starting in 2021
- Next year, the two companies plan on taking their partnership to the next level **by removing the safety driver from their autonomous box truck**
- For residential deliveries, if there is no driver in the vehicle, how do packages get delivered? UPS Workhorse test incorporates drone delivery into day-to-day delivery operations. Eventually this vehicle may be autonomous using technology from tusimple
- Robots may replace delivery vans. Amazon is piloting the "Scout" to deliver packages directly in urban environments

Source: Forbes

TuSimple

- Launched autonomous freight network (AFN), an ecosystem with UPS , Penske, U.S. Xpress , and McLane Company Inc. which allows self-driving trucks (with human safety drivers in the cab) to come to market safely and efficiently.
- AFN consists of autonomous trucks, digital mapped routes, strategically placed terminals, along with TuSimple Connect (operations monitoring system)
- Penske will also provide preventive maintenance and over-the-road service to TuSimple's L4 autonomous trucks to help keep them running day and night.
- TuSimple will expand driverless operations nationwide adding major shipping routes throughout the lower 48 states allowing customers to utilize their own TuSimple equipped autonomous trucks on the AFN by 2024

Source: Fleet Owner

Build Vs. Convert

- Current US safety rules require that a motor vehicle have traditional controls, like a steering wheel, mirrors, and foot pedals, before it is allowed to operate on public roads
- Although many states have passed AV laws, Congress has not passed federal legislation that would allow companies to deploy fleets of self-driving vehicles exempted from these rules
- Some companies sell conversion kits

Source: Autonomous Vehicles | Self-Driving Vehicles Enacted Legislation

Mitigating the Driver Shortage

&

The Bottom Line

How many driver jobs went unfilled in the trucking industry in 2020?

- 5,000
- 10,000
- 20,000
- 60,000
- 80,000

Fleet Owner

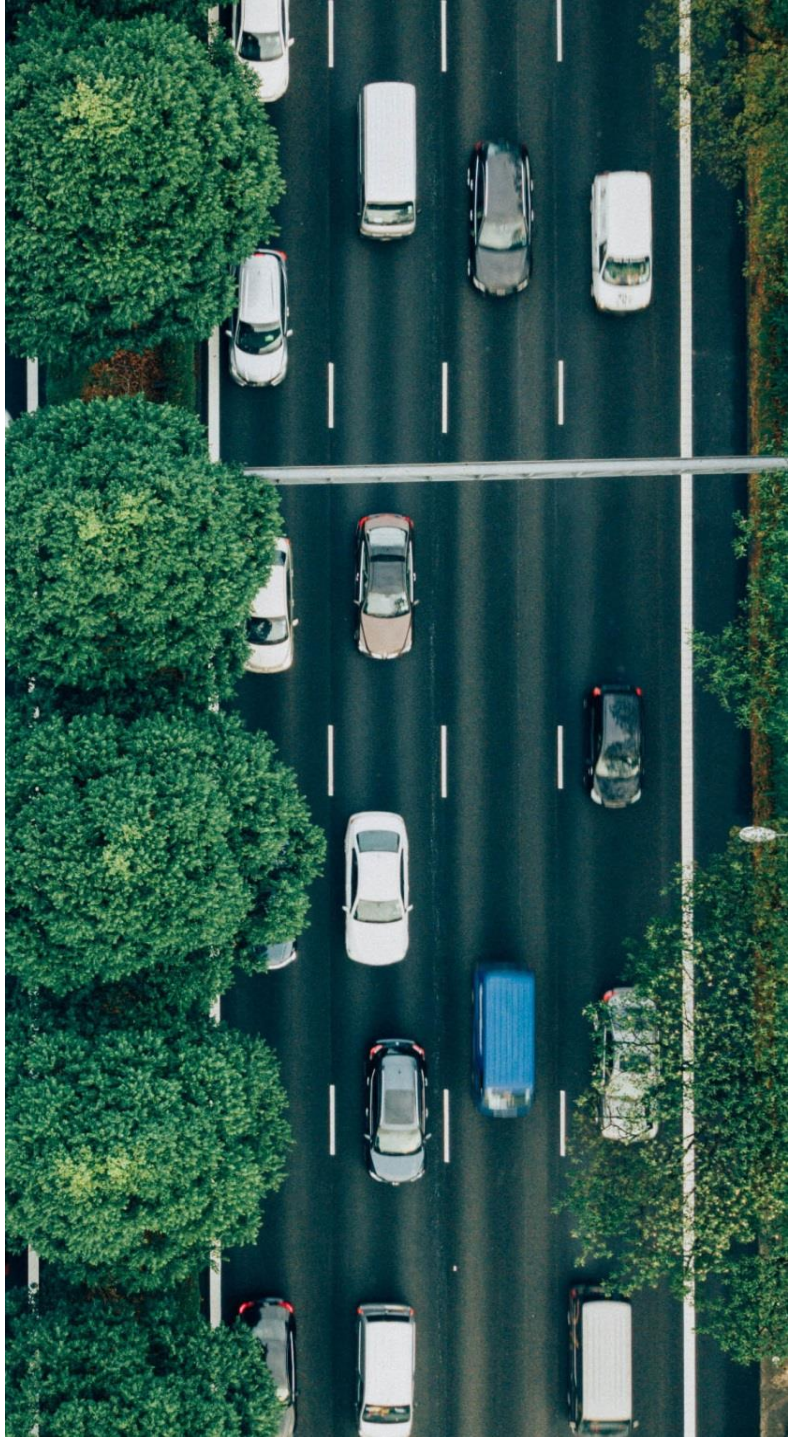
Why It Matters

- Companies are interested in driverless technology because they can more effectively
  - Control quality
  - Decrease costs
  - Get their products to market faster

Driver Shortage

- **~73% of US freight (be weight) is moved by motor truck**
- But there are not enough people to do the work
- The shortage of truck drivers has grown to ~60,000 (or potentially higher)
- Why? The federal stimulus (unemployment benefits > pay), retirement rate due to ageing workforce, failure to pass drug and alcohol test, and inability to recruit new talent (88% do not meet application requirements)

Source: American Trucking Association Driver Shortage



Reducing Accidents

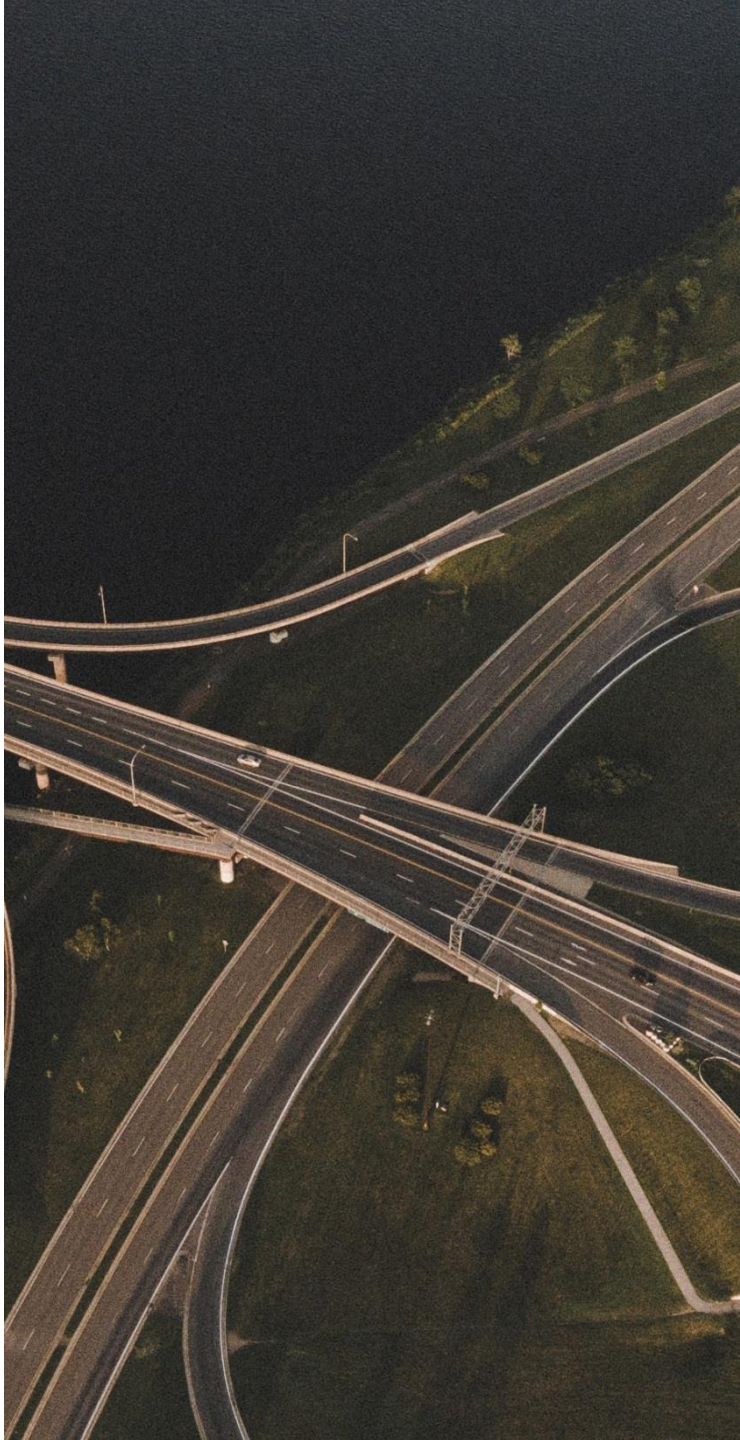
- **Machines don’t get tired, distracted, drink alcohol or take drugs**
- ~95% of accidents are caused by driver error
- ~74% of all fatal passenger vehicle cases include a large truck
- ~$1b cost reduction, due to reduced paperwork and time-savings, keeping tired drivers off the road

Source: Cerasis Policy Advice baileyjavinscarter

Decreasing Turnover

- **Assuming that some day drivers won't be needed, their "robot" replacements won't look for another job**
- They also do not need salaries, which will increase because of supply and demand in the trucking industry
- They also do not need health insurance, a major expense for most companies
- Turnover rate for truck drivers is >4x worse than the average for other industries
- This drives up expenses for carriers and, eventually, shippers

Source: ATBS



#1 Expense: Fuel
39% Cost

#2 Expense: Pay
26% Cost

Inland Marine

Transportation Insurance

Underwriting Checklist

When asked to insure goods being transported by an autonomous vehicle, we should be concerned about the following in particular:

- Accidents
- Theft
- Cyber
- Terrorism

Who, What, Where and How

Who?

- is the applicant
- performs maintenance

What?

- is the exposure – semi-autonomous (18-wheeler) or fully driverless [box truck (soon)]
- driverless technology is being adopted for what % of the fleet
- cyber controls are in place
- backup plan is in effect if the vehicle runs into trouble
- autonomous operations monitoring system is in effect

Where?

- warehouse to warehouse on dedicated route that has been mapped
- direct to consumer
- is the driverless vehicle being utilized - on a route that will likely experience inclement weather

How?

- often has the route been traveled and what incidents have taken place
- often is the vehicle being used and monitored
- willing is the insured to share data with the underwriter (& our actuary friends)

CONFIDENTIALITY LEVEL

If everything checks out…

and everything works as it should…

then….

What % of losses for motor truck cargo insurance are due to breakage and collision?

- 17%
- 35%
- 51%
- 75%
- 89%

Accidents Decrease

- Damage to cargo due to accidents is a leading cause of loss, often due to driver fatigue
- The quality of drivers as evidenced by government safety statistics and MVRs is a major part of the decision making and pricing point in underwriting
- **“Remove” human drivers = lower premium**

Theft Claims Decrease

- Theft claims are another leading cause of loss
- **The average theft claim is ~$230,000**
- Claims of this sort can be quite high for certain commodities – several million dollars - such as electronics and pharmaceuticals

No Collusion

- Often-times underwriters will buy reinsurance for high value shipments to protect their loss ratio, the cost of which is passed on to the consumer
- Underwriters review the expiring carrier's loss experience to help price this cause of loss, as well as to set terms and conditions, e.g., theft limitation
- **Many thefts are committed by the driver in collusion with a non-employee**

No Stops

- Trucking companies will not let their drivers stop in “red zones” - areas where theft is highly likely to occur
- They monitor these driving routes using GPS
- An alert occurs if the driver operates outside of the expected path or takes a break in these high-risk areas
- The only reason a non-human driver would need to stop is to refuel
- **“Remove” the human driver and you will have fewer theft claims, and a lower premium**

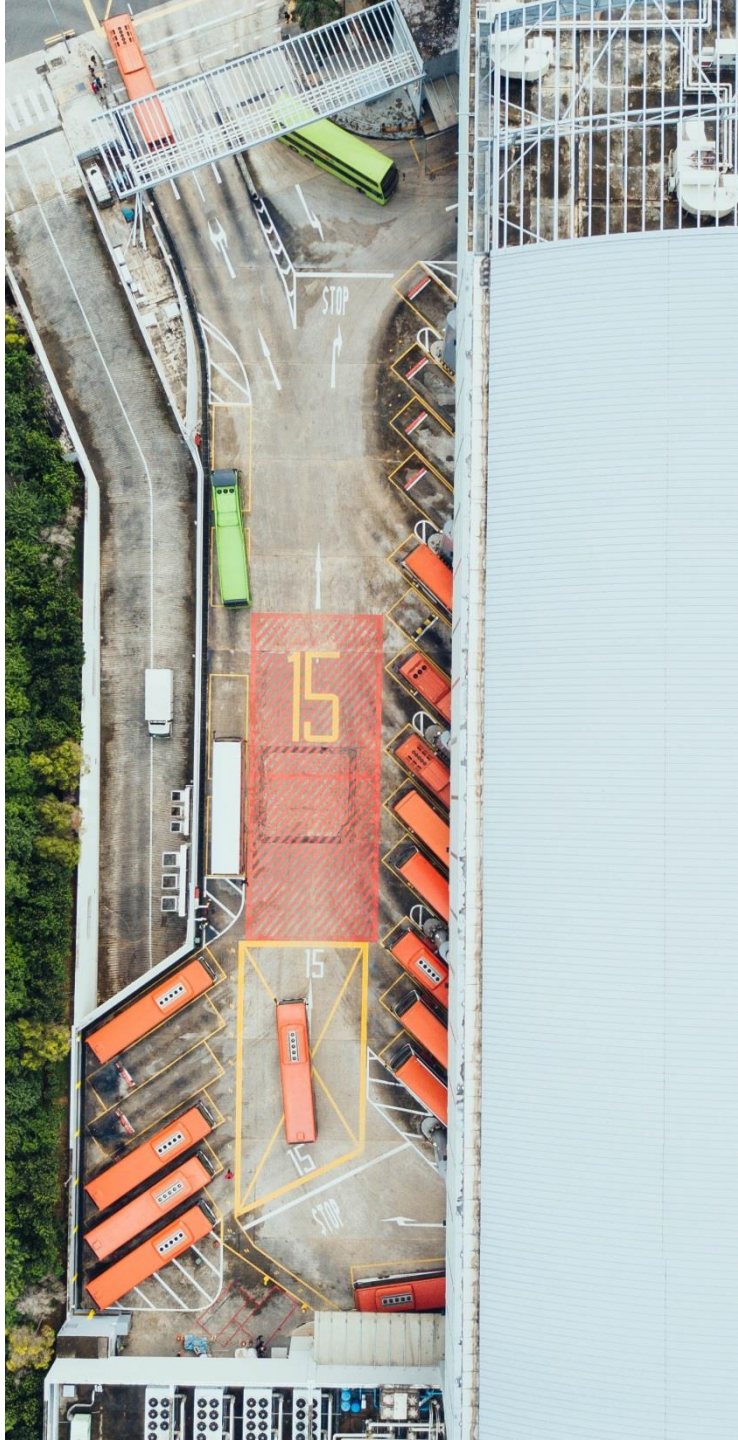
Cyber and Terrorism

- Common dongle (2-inch-square gadget designed to be plugged into dashboards and used by insurance firms and trucking fleets to monitor vehicles' location, speed and efficiency) can be hacked to disable car brakes and other technology
- Terrorist attack scrambling the network is a real risk
- **Hacking an 18-wheeler and causing a major accident could quickly put the adoption of the technology on hold**

Summary

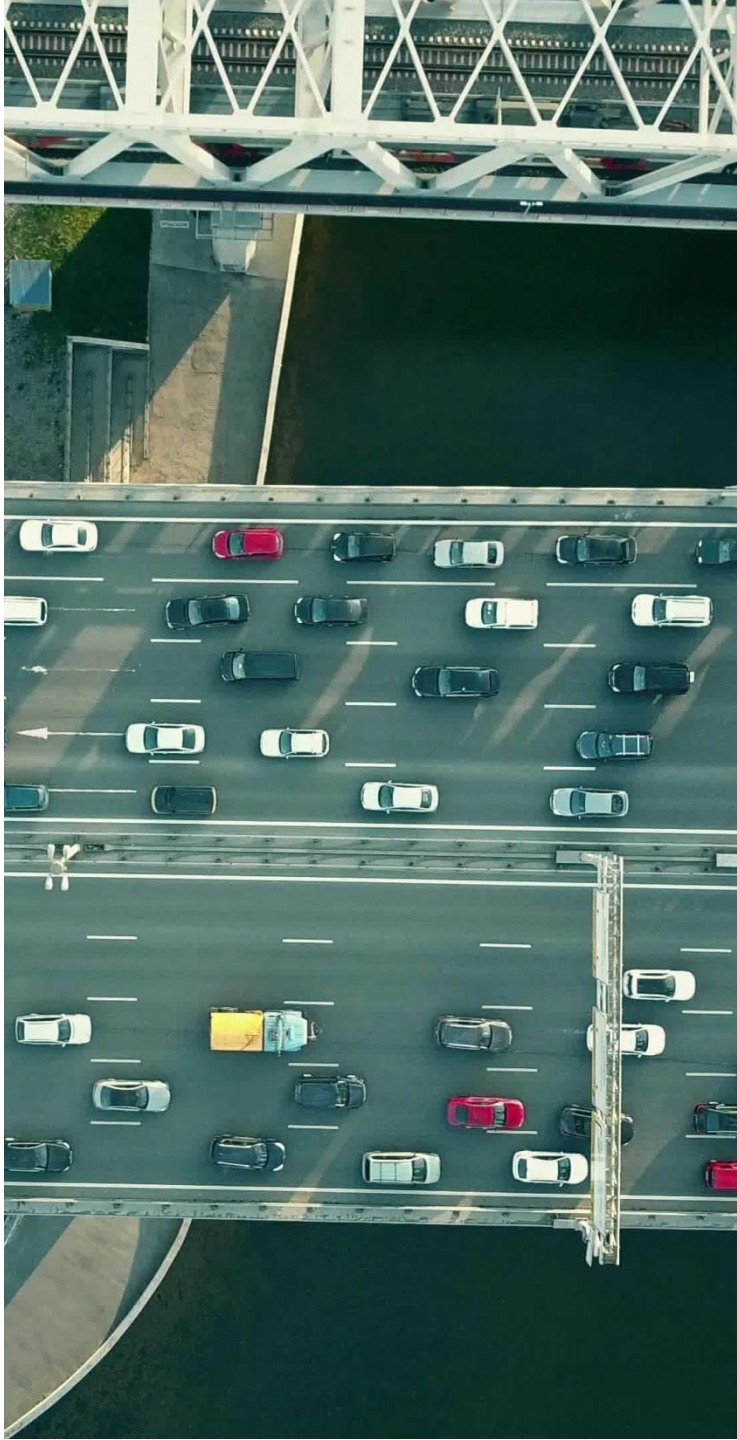
Less Premium Per Unit

- If driverless vehicles become the norm, accidents and theft claims should decrease (ISO 5-year loss ratio for motor truck cargo is 61%)
- This could lead to lower experience (loss) rating, and a lower charge per unit
- **Carriers that provide inland marine coverage for the transportation industry may see their *rates* go down, but….**



More Exposure Units

- “Driverless” vehicles may solve the driver shortage
- **Premium *volume* should increase with more trucks on the road**
- The driver might not disappear, at least not yet



Not Everyone Wins

- There are ~8 million trucking related jobs (~3.6 million drivers)
- 1,800,000 jobs might be phased out over the next decade
- Their income creates plenty of other jobs in other industries
- **Huge parts of the economy could be affected by the replacement of human drivers with machines**

Source: Trucking Info.

Is The Insurance Industry Ready?

- Underwriting practices will change
- **Over time, the quality of drivers may not be the focus, but rather the quality of the technology installed, maintenance procedures, upgrades, cyber controls, etc.**
- Analytics (based on truck performance) will be more readily available and shared with underwriters to help segment risk and pricing

How are you going to adapt?

Telematics

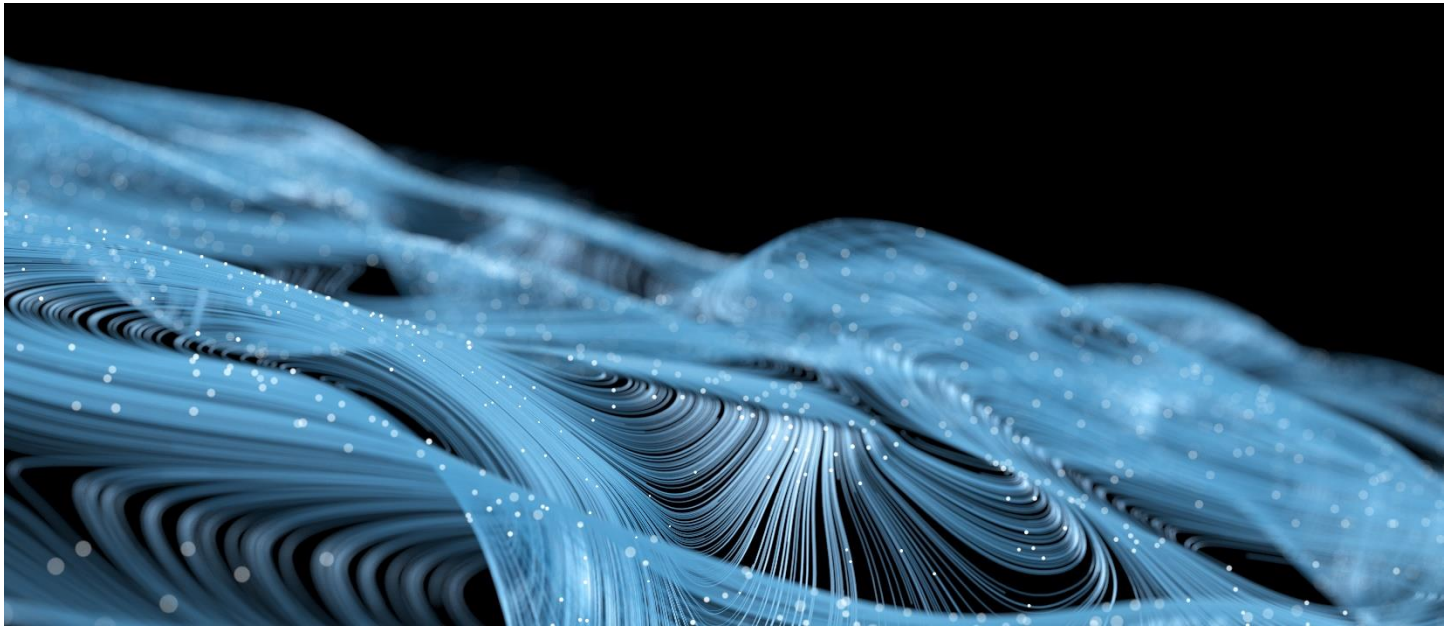
Telematics

Telematics

noun

The branch of information technology which deals with the long-distance transmission of computerized information.

Oxford Languages

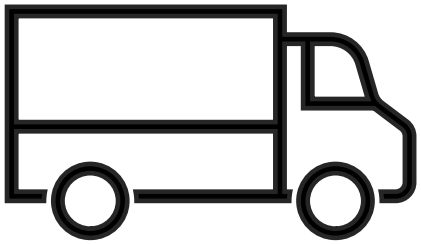


Telematics in Transportation

- Compliance
- Vehicle, Asset and Cargo Tracking
- Driver Behavior & Safety
- Equipment Maintenance
- Fleet Productivity & Efficiency

Types of Telematics

- Compliance
  - ELD- Electronic Logging Devices
  - DVIR- Driver Vehicle Inspection Report
- Vehicle, Asset and Cargo Tracking
  - GPS Tracking Devices
  - Temperature Monitoring
  - Light Monitoring
  - Pressure Monitoring
  - Route Guidance
  - gForce Tracking



Types of Telematics cont.

- Driver Behavior & Safety Monitoring
  - Drive Cameras
    - *Front, driver facing, side cameras, mirror cameras, rear cameras*
    - *Distracted Driving Monitoring*
    - *Driver Drowsiness Monitoring*
    - *Seatbelt Monitoring*
    - *Traffic Signal Violations*
  - Speed Monitoring
  - gForce Tracking
  - Hard Braking Monitoring
  - Hard Acceleration Monitoring
  - Stop Sign Violations
  - ADAS- Advanced Drive Assistance Systems
    - *Braking*
    - *Warning*
    - *Steering*
    - *Monitoring*

Types of Telematics cont.

- Equipment Maintenance
  - Real-time engine diagnostics
  - Custom maintenance schedules
- Fleet Productivity & Efficiency
  - Fuel Efficiency
  - Driver Dispatching
  - Route Guidance
  - Smart BOL- Bill of Lading

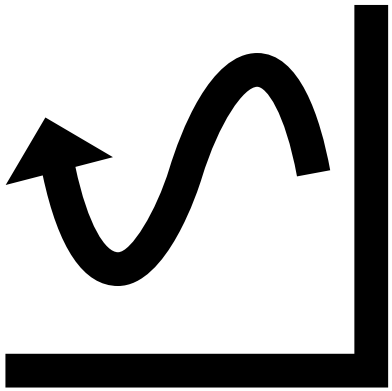
Pros and Cons of Telematics

- Benefits of Telematics:
  - Increased transparency
  - Improved efficiencies
  - Decreased losses
  - Improved delivery

- Problems with Telematics:
  - Cyber risk
  - Can be expensive
  - Can be disruptive
  - Drivers don’t always like
  - Data without accountability and meaningful application can be a liability

Implications of Telematics on Insurance

- Underwriting
  - Additional data for improved underwriting, pricing and forms/endorsement customization
  - Properly applied telematics make safer motor carriers and ideally fewer losses
- Claims
  - Inculpating and exculpating data
  - Theft tracking and recoveries
  - Evidence for improved subrogation efforts



New Challenges

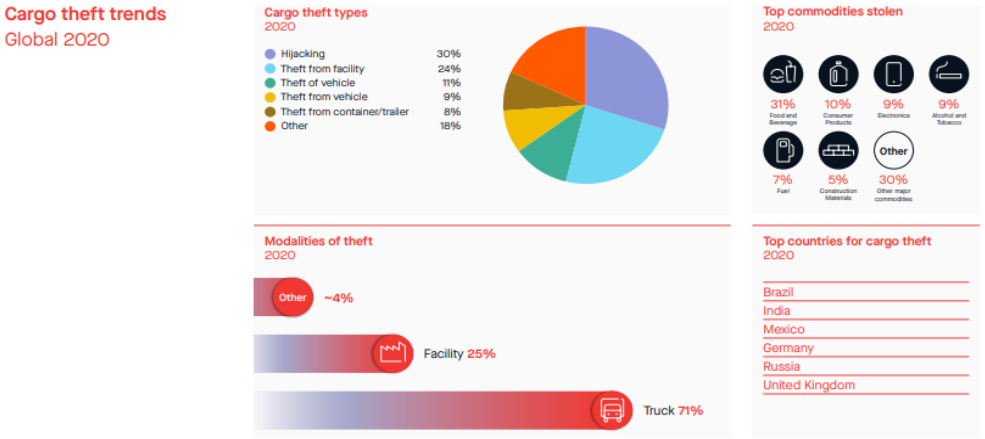
New Challenges: Vaccine Mandates and Employee Shortages

- The employee marketplace is tight, making retention and recruiting difficult
- Small businesses that are exempt have a hiring advantage
- Employers are exempt from liability leaving workers vulnerable in the event of a vaccine related injury
- The AP NORC poll shows only 47% of in person employees favor employer vaccination policies
- How this will affect all aspects of the supply chain is still unknown

Source: AP: Vaccine mandate spawns new fear: finding and keeping workers

New Challenges: Supply Chain Disruption and Bottlenecks

- "Cargo at rest is cargo at risk"
- Supply chain disruption is the new normal due to COVID 19 and other factors, such as voluntary low labor participation rate
- When goods become scarce, theft claims increase
- Determining the client's supply chain management plan is crucial



Source: [bsi-wp-supply-chain-risk-insights-061721.pdf]

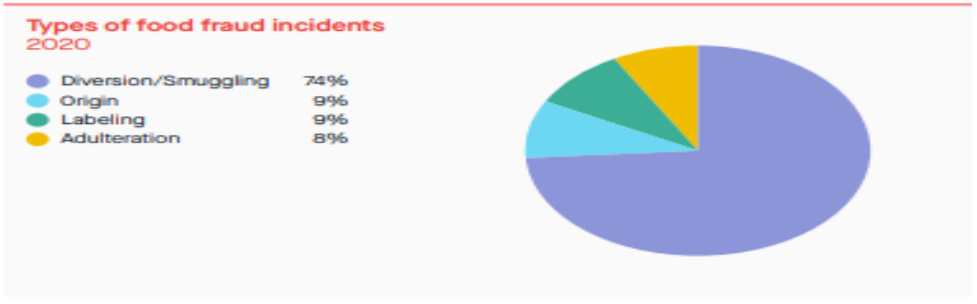
New Challenges: “Containergeddon”

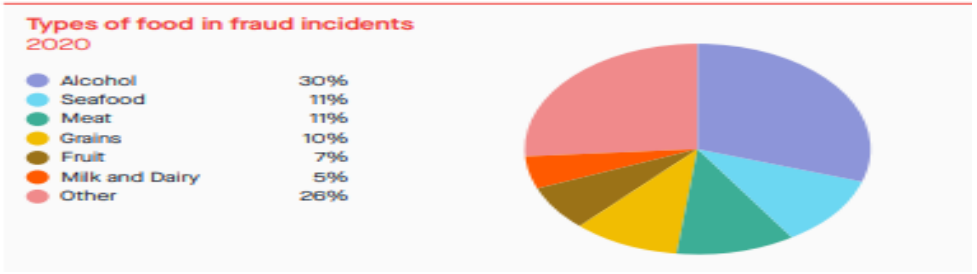
- Containers and containerships are in short supply.
- Some major retailers are hiring their smaller, dedicated cargo ships for transport, which can offload in smaller port facilities. These stevedores may be less experienced, however, increasing the likelihood of loss
- Many of these vessels are not containerships at all. For example, dry bulk ships that transport grain are now used to transport Batmobile Transformers
- Container shipping prices have increased as supply has decreased
- Aggregations will increase

Source: [BSI 'Containergeddon': Supply crisis drives Walmart and rivals to hire their own ships | Reuters]

New Challenges: Food Fraud

- Food fraud is on the rise in certain countries
- The US imports 15% of its food according to the latest FDA statistics
- The top partner countries from which United States Imports Food Products include **Canada, Mexico, France, Italy and Singapore** (some of these countries have had a problem with food fraud)
- There is a higher risk that product may be rejected or deemed adulterated after a covered cause of loss





Sources:[FDA Strategy for the Safety of Imported Food | FDA]

[BSI]

Thank you

US only (non Risk Consulting)

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