

CRISIS MANAGEMENT // PRODUCT RECALL // ASIA PACIFIC

Automotive Recall Report for passenger vehicles and light trucks

DECEMBER 2023

Pandemic-driven shortages, production shutdowns, acute labour shortages, supply chain bottlenecks, rising commodity prices, changing technology, automation and electrification are reshaping the passenger vehicle and light truck industry (automotive industry).

Over the past two years, there has been a 48% increase in light vehicles recalled in the US. The majority of these recalls are attributed to issues with fuel systems, air bags, visibility and exterior lighting. Today, we're seeing an average of 400 recall campaigns each year, requiring the recall of almost 30 million vehicles in the US alone. Additionally, electric vehicle (EV) batteries have recently been involved in some of the most expensive recalls in history, with more battery manufacturers being involved in recalls, most of which experiencing at least one recall in the last three years (National Highway Traffic Safety Administration 2023).

The Liberty Specialty Markets (Liberty) 2023 Automotive Recall Report explores:

- ▶ Trends in recall campaigns
- ▶ Affected components
- ▶ Recall frequency
- ▶ Recall size
- ▶ Recall size variability

TRENDING
TOPICS

Understanding the financial impact of an Automotive Component Recall

Small to medium sized suppliers of automotive components are most likely to be financially impacted.

In the event of a safety or non-compliance issue with automotive components, businesses that manufacture, import, distribute or sell defective components, are responsible for taking recall action.

A recall event can be very expensive and small to medium sized suppliers of these automotive components are the most likely to be financially impacted.

The costs associated with a recall event:

- ▶ Repair, replacement and remanufacturing
- ▶ Dismantling and reinstallation
- ▶ Logistics and transportation to withdraw the product from the market
- ▶ Additional labour and staff to effect the recall of the affected product
- ▶ Product inspection
- ▶ Redistribution of restored products
- ▶ Public relations, including media releases and mass communications through a variety of channels to consumers, suppliers and distributors.

Liberty PRplus Automotive Component Recall insurance

We offer a PRplus Product Recall policy for automotive components. Customised for individual client's needs, and with all the benefits of a Liberty PRplus product, Automotive Components Recall insurance also includes cover for exports to the USA and Canada, the ability to include product guarantee and covers critical components.

In addition to protection against losses such as recall costs (both retailer and consumer), replacement, refund and repair costs, and consultant advisor costs, PRplus Automotive Components Recall insurance also provides protection against third party financial loss and more.

To find out more, read the product profile:

- ▶ [For Asia](#)
- ▶ [For Australia](#)



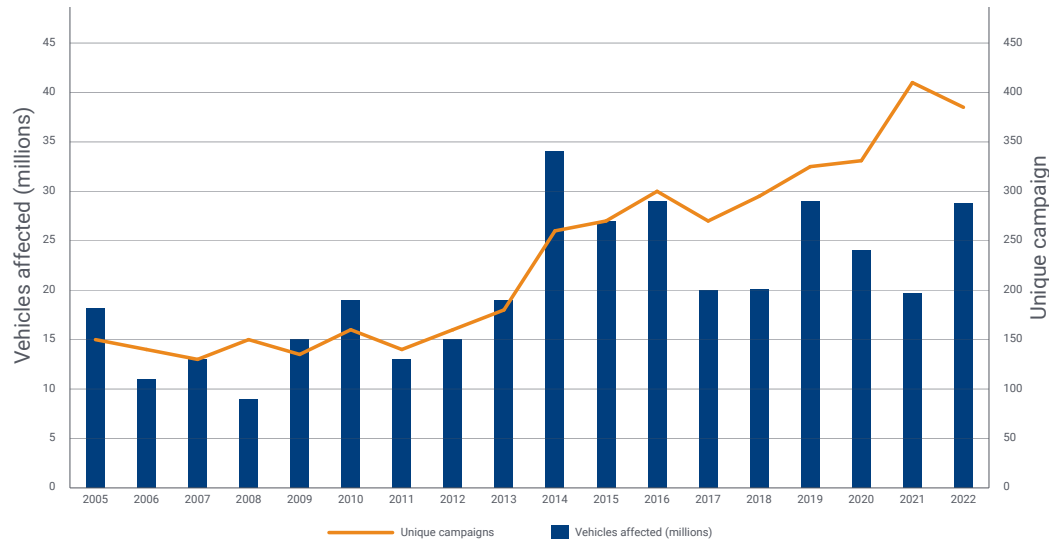
Trends in automotive recall campaigns

Today we are seeing an average of 400 recall campaigns each year requiring the recall of almost 30 million vehicles in the US alone

Increases in vehicle recalls and recall campaigns

The number of unique recall campaigns, exclusive of Takata recalls, has increased over the last ten years from less than 150 in the mid-2000s, to an average of 400 in the last two years. From 2018 until 2021, a new all-time recall record was registered every year (295 in 2018, 325 in 2019, 331 in 2020, 410 in 2021). Recall campaigns decreased slightly in 2022, from 410 to 385 (decreased by 6%), but remains well above historical average.

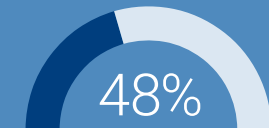
Figure 1: Unique recall campaigns and affected vehicles per year (USA)



The total number of light vehicles recalled in the US in 2022 was 28.8 million, 9.1 million more than 2021, excluding Takata airbags.

Light vehicles recalled (USA)

Annual overall increase



Recall campaigns decreased slightly in 2022, from 410 to 385 (decreased by 6%), but remains well above the historical average.

Recall campaigns (USA)

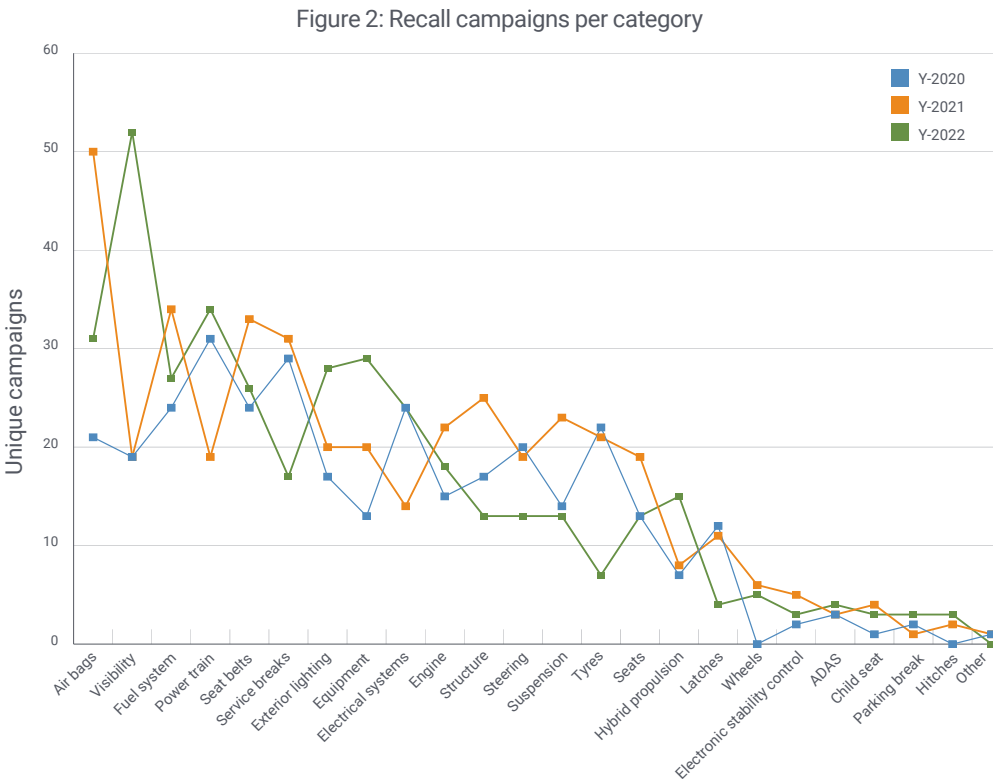
Increase of 250 represents an overall increase of



Note: The charts throughout this document have been generated using National Highway Traffic Safety Administration (NHTSA) data.

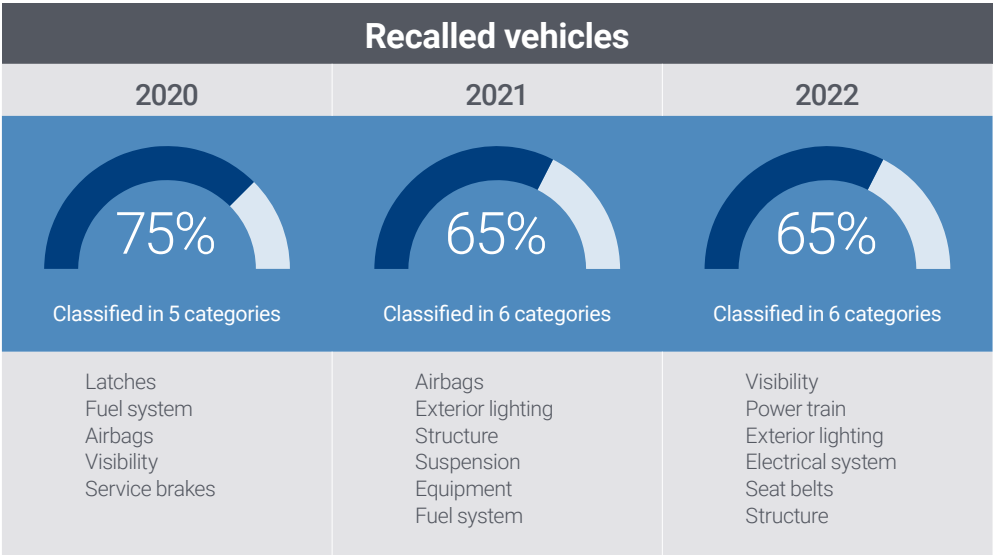
Affected components

According to their functionality, the NHTSA group car components into 25 different categories. Historical data shows that between 65% and 80% of the recalled vehicles are grouped in 20% of these categories. Figure 2 below represents a summary of the total number of recalled vehicles for each of the 25 categories over the last three years.



(NHTSA 2023)

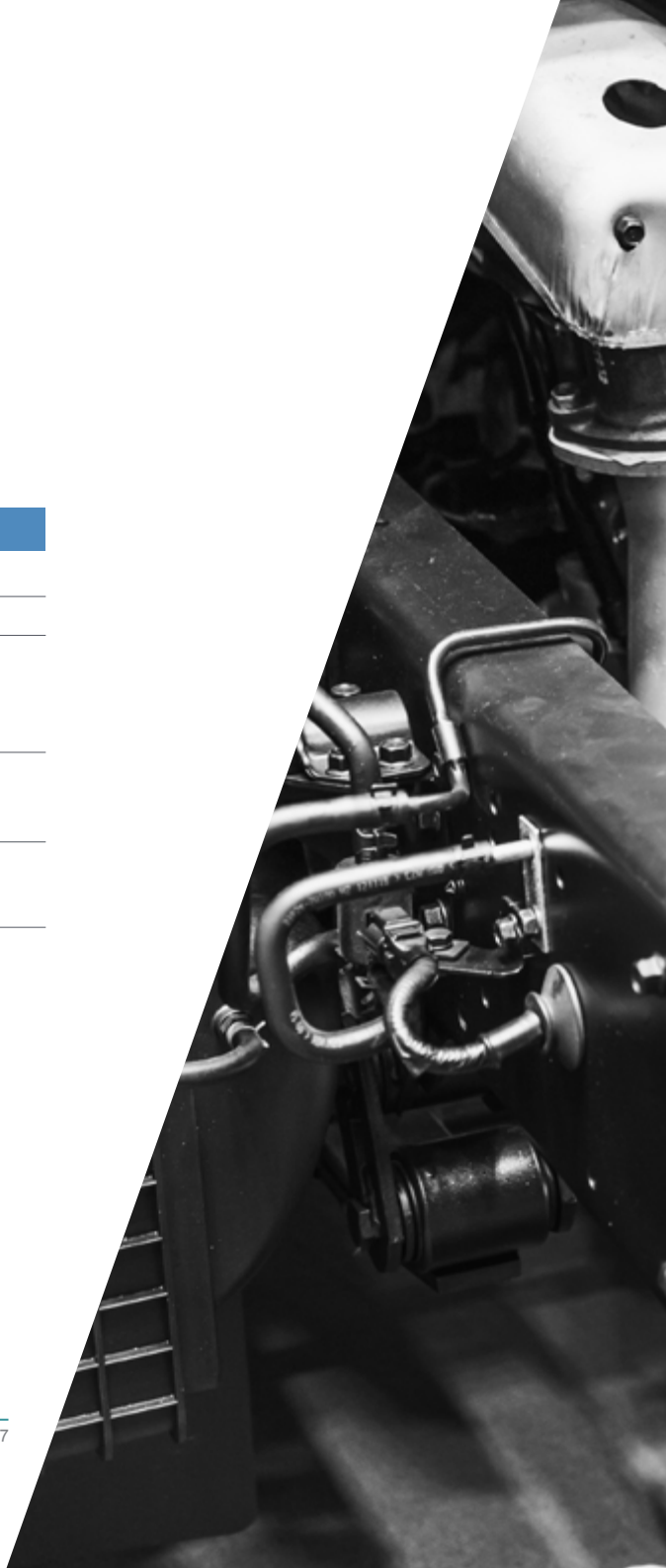
The categories that have consistently impacted more vehicles from 2020 to 2022 are fuel systems, air bags, visibility, and exterior lighting.



Affected components

These four categories have consistently caused more recalls

Top recalled categories		
System	Affected components	Examples
Fuel system	Pump	Several pump recalls; different suppliers (Denso , Cummins , Bosch)
Air bags	Inflator	Several manufacturers issued recalls due to defective inflators – JSS (acquired Takata's assets), Autoliv , etc.
	Airbag control unit (ACU)	
Visibility	Rear-view camera wipers	ACU – defective electronic components (KIA), software bugs (VW)
		Rear-view camera – most of them software-related
Exterior lighting	Large recalls in 2022 impacting wipers – ball joints , arms , motor	Adaptive headlights – software bugs
	Adaptive/smart headlight system	Hardware defects – switches , wiring harness
	Electric components (switch, relay, LED driver)	



Affected components

While not the primary driver of recalls, over the past these components have been in the spotlight

The rest of the categories only impacted a large number of vehicles in one year, it seems that this was due to isolated incidents. Even when structure appeared as a 'top recalled category' in 2021 and 2022, this was caused by two specific assembly errors to original equipment manufacturers (OEMs), no defective components involved.

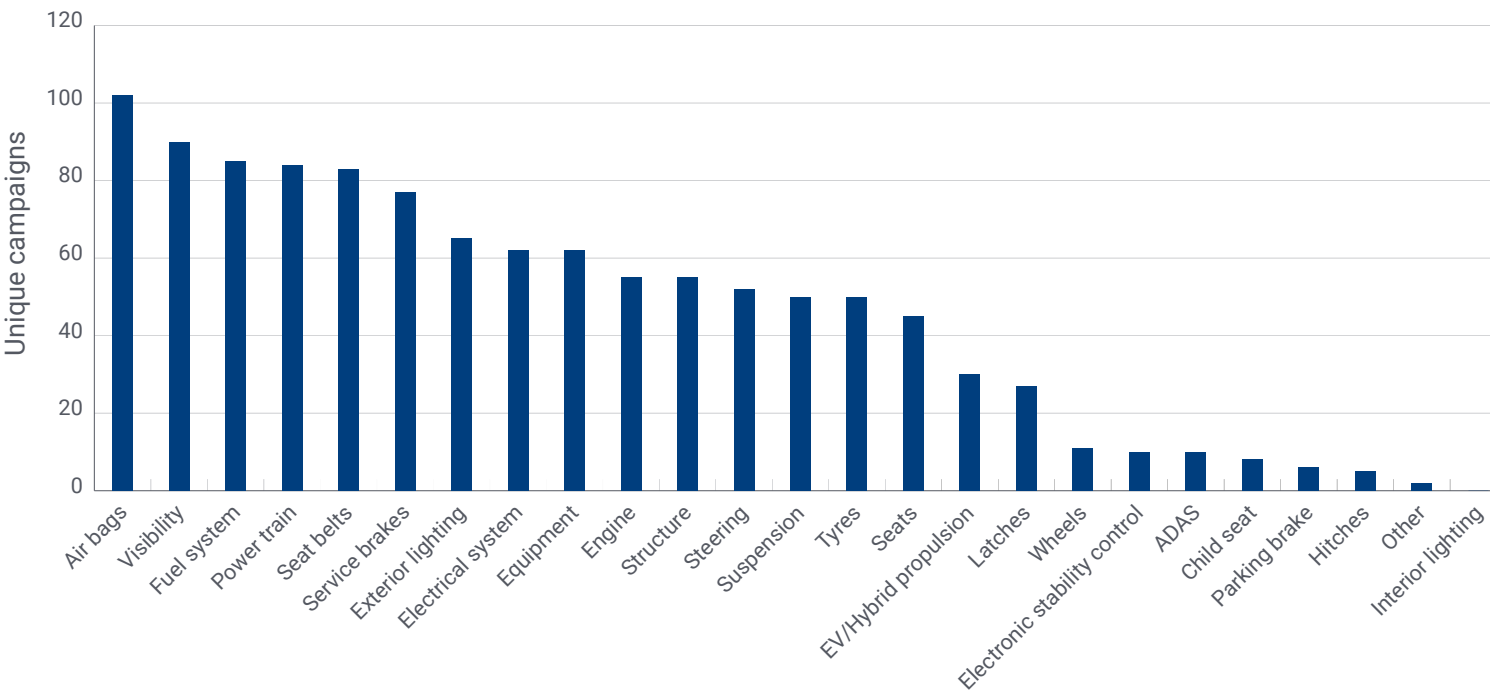
Isolated incidents		
Equipment	eCall	Mercedes recalled more than 1.6 million vehicles in 2022 because a failure of the eCall system resulted in emergency services being dispatched to the wrong location.
Latches & locks	Latches	Ford recalled 2.1 million vehicles in 2020 because the latch pawl spring may fracture. Nissan recalled 1.8 million vehicles in 2020 due to latch corrosion.
Structure	Tailgate and hood assembly	Chrysler recalled 1.2 million vehicles due to an assembly error, misaligned tailgates. Honda recalled 700k vehicles because the gap between the grill and hood were out of specs resulting in excessive hood vibration.
Service brakes	ABS control module	Hyundai group recalled more than 2 million vehicles due to short circuits in the ABS control module – manufactured by two suppliers Hyundai Mobis and Mando .
Suspension	Toe link	GM recalled almost 800k vehicles due to ball joints fracturing; vehicles driven in corrosive environments.
Power train	Shift cable bushing	Ford recalled almost 3 million vehicles due to damaged shift cable bushings.
Electrical system	Connector	Nissan recalled more than 800k vehicles due to corrosion in an electrical connector.
Seat belts	Audible chime pretensioner	Tesla recalled more than 800k vehicles because the audible chime didn't activate when driver hadn't buckled their seat belt – software bugs. Hyundai Group recalled 450k vehicles because pretensioners may explode.



Recall frequency

Air bags are the most commonly recalled category of automotive components, with 102 recalls taking place over the past three years. On average, 34 recalls impacting airbags (excluding Takata) are issued every year. Visibility and Fuel system rank second and third respectively. Figure 3 shows the number of recall campaigns over the last three years per category.

Figure 3: Individual recall campaigns 2020-2022



Recall size

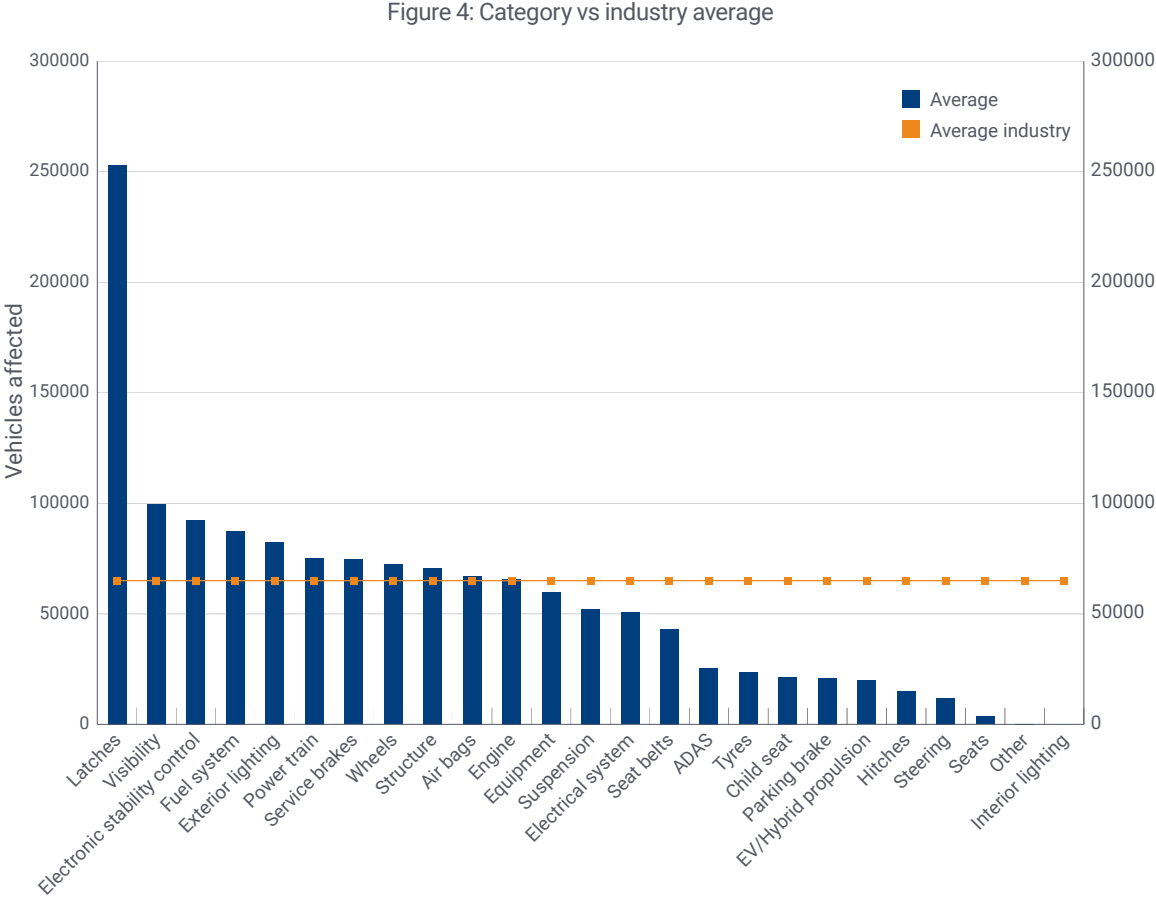
The average recall size in the industry over the last three years is 65,000 units

2020-2023

6 recalls exceeded
1.5 million components

The average recall size of 10 categories is above industry average of which, latches, visibility, fuel system, exterior lighting, air bags, power train and service brakes were already identified in the previous section of this report as the categories impacting more vehicles. Figure 4 compares the average recall size of each category against the industry average.

Latches stand out from the rest with an average recall size almost four times higher than the industry average. As seen in Figure 3, there are few recalls involving latches, but all of them have impacted a very large number of vehicles. Latches are a modular component and technology has hardly changed over the years. These recalls normally impact several models and model years.



Recall size

Over the last three years, six recalls were very significant in size, exceeding 1.5 million units

Power Train [Ford recalled 2.92 million vehicles](#) in 2022 because the bushing that attaches the shift cable to the transmission may degrade, preventing the shifter from moving the transmission to the intended gear position.

Airbags [Toyota recalled 2.89 million vehicles](#) in 2020, because the integrated circuit in the Airbag Control Unit didn't have sufficient protection against negative electrical transients. Negative transients could be generated in certain severe crashes, and this can lead to incomplete or nondeployment of the airbag.

Latches [Ford recalled 2.1 million vehicles](#) in 2020 because some door latches were found with a fractured pawl spring tab. This condition would typically result in a "door will not close" function. Ford issued two recall notices in 2015 and 2016 for the same reason, the remedy was not effective, and they recalled these vehicles again.

[Nissan recalled 1.83 million vehicles](#) in 2020 due to latch corrosion. Similar to the previous example, Nissan issued a recall in 2016 but the remedy wasn't effective – they recalled these units again.

Fuel system [Toyota recalled 1.83 million vehicles](#). Fuel pumps manufactured by Denso contained impellers which were manufactured with lower density. In some cases, the impeller deformed, and the fuel pump became inoperative.

Similar to the above example, [Toyota issued another recall](#) for 1.51 million additional units.

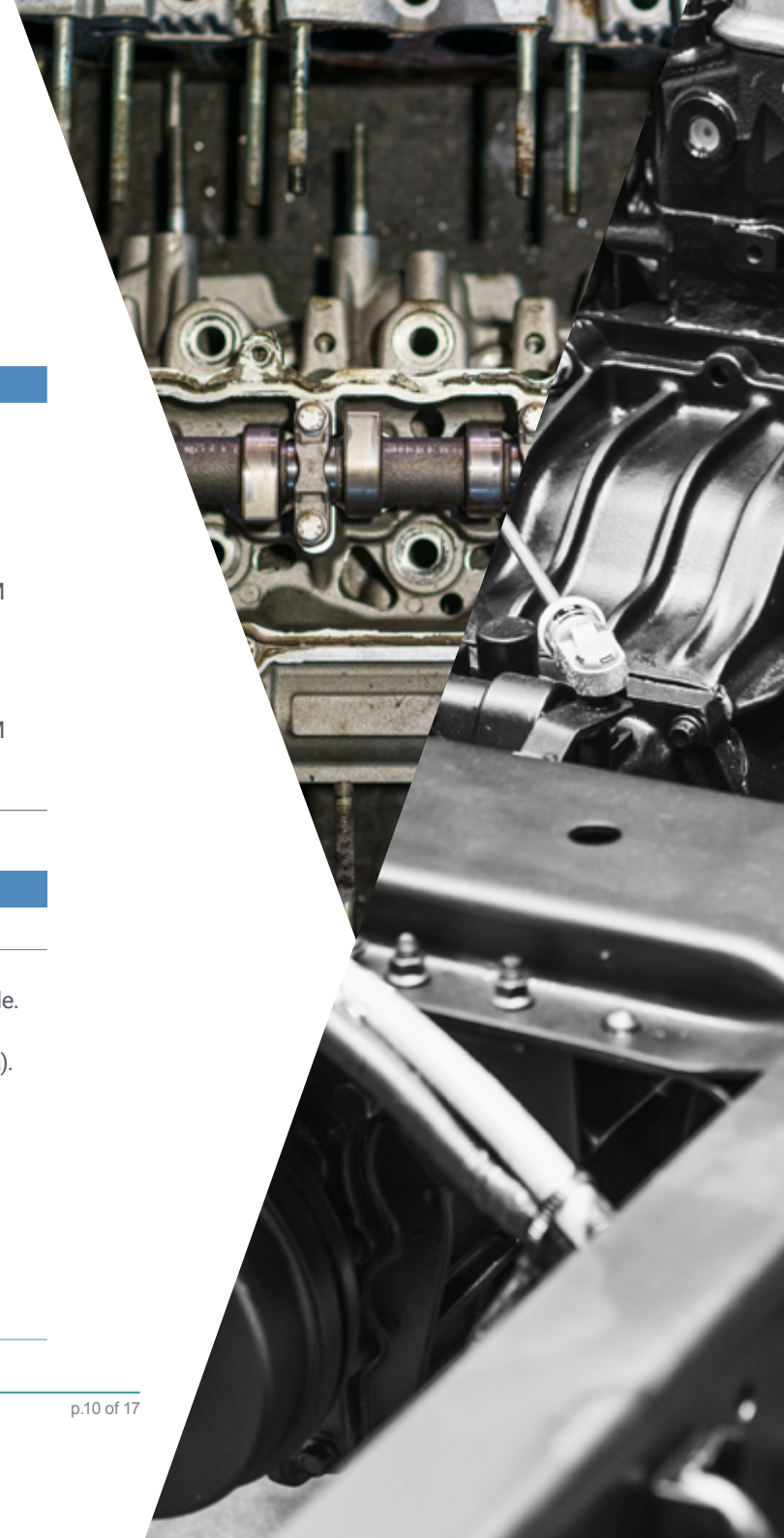


Largest recalls in 2022

Category	Units affected	Reason	OEM	Tier 1
Power train	2.9m	Bushing that attaches the shifter cable to the transmission may degrade → may prevent the vehicle from shifting	Ford	Hilex (Japan)
Latches	1.2m	Tailgate may not latch properly → loss of cargo	Chrysler	ITW (USA)
Visibility	1.1m	Window automatic reversal system may not react → pinching user	Tesla	Software developed by OEM
Engine	917k	PCV valve may short circuit → risk of fire	BMW	Mahle (Germany)
Equipment	817k	Audible chime may not activate when driver hasn't buckled seatbelt → driver unaware that seat belt is not fastened	Tesla	Software developed by OEM

Other large recalls involving Asian tier 1 companies 2022 – excludes Hilex recall impacting 2.9 million units

GM	Toyota	Kia	Hyundai
681k vehicles. Ball joints of windshield may experience high corrosion, causing wipers to fail. Manufactured by Mitsubishi (Japan). (NHTSA 2022)	458k vehicles. ECU software malfunction, driving with deactivated ESC. Manufactured by Advics (Japan). (NHTSA 2022)	410k vehicles. Contact between ACU and memory chip causing damages to the board. Airbags might not deploy during a crash. Manufactured by Hyundai Mobis (Korea). (NHTSA 2022)	357k vehicles. Electrical short in ABS module. Risk of fire. Assembled by Mando (Korea). (NHTSA 2022) 245k vehicles. Electrical short in exterior lighting module. Risk of fire. Assembled by SEGI (Korea). (NHTSA 2022)



Technological trends

Electric vehicles (EV) batteries have recently been involved in some of the most expensive recalls in history

Electrification

The total costs of some EV recalls are estimated to have exceeded US\$1 billion (GM 2021).

EV recalls – 2020 to 2022

2020	2021	2022
Three recalls impacting three different brands GM recalled 50,932 Chevrolet Bolts because the high voltage battery supplied by LG Electronics may pose a risk of fire when charged to full or very close to full capacity. Temporary measure was to modify the BMS software to limit the charging capacity to 90%. Most likely cause of the problem is a folded separator and torn anode. Hyundai recalled 6707 Kona Electric vehicles; the high-voltage battery system may have been produced with internal damage. Batteries were manufactured by LG Chem. The most likely root cause of the problem is a folded anode. BMW recalled 4509 hybrid vehicles because the high battery voltage may have not been produced according to specifications. During battery cell production, debris may have been able to enter one or more battery cells. Debris could cause a short circuit. Batteries were manufactured by Samsung SDI.	Three recalls, GM expanded the recall issued in 2021. Hyundai issued another recall for batteries manufactured by another supplier GM recalled 141,000 vehicles in total, adding 90,068 vehicles to the previous recall and ordering the replacement of the entire battery pack. All the batteries were manufactured by LG Electronics. Hyundai issued a new recall involving 4696 vehicles, batteries were manufactured by LG Energy Solutions China, most likely root cause is a folded anode.	Four recalls – more battery manufacturers involved Chrysler recalled 16,741 vans, root cause hasn't been identified, but several reports of batteries catching fire. BMW recalled 14,086 electric vehicles because the BMS may experience an interruption of electrical power. No thermal runaway risk, but this might result in loss of power. Battery pack and BMS manufactured by Panasonic. BMW recalled 83 EVs because a cathode plate may have been damaged during production, which could lead to a short-circuit. Batteries were manufactured by Samsung SDI. Polestar recalled 66 vehicles because a manufacturing defect could potentially lead to overheating of the battery cells. Batteries were manufactured by Zhejiang Forever New Energy Technology.

The size of most of these recalls is well below industry average, but replacement costs are very expensive, with an entire battery pack replacement potentially costing up to US\$20k. For example, even the smallest recall (Polestar 2022) that only involved 66 units, total replacement costs are estimated to be around US\$1m.



Technological trends

Examples of EV recalls in other regions – 2020 to 2022

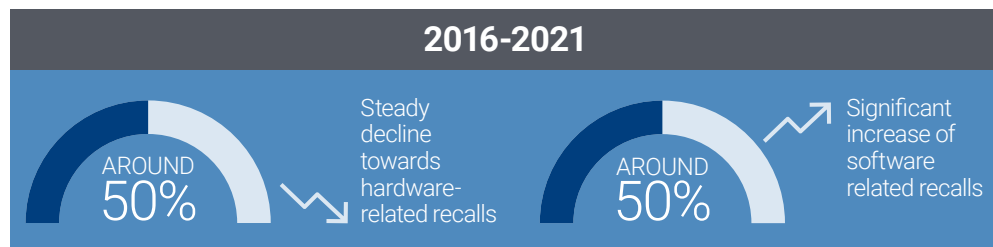
- China** Great Wall & Chery (2021) recalled 17,623 vehicles.
- Nio (2021) issued a recall for 5000 vehicles due to fire risk. The cause of the fire was an improper alignment of a voltage sampling cable harness and the upper cover of the battery module. In this case the battery cells were not defective, but an inadequate integration of different battery components.
- BYD (2022) recalled more than 50,000 vehicles due to faults with the battery pack trays. Like the previous case, battery cells were not defective, but the battery pack housing posed water inflow risks.
-
- Europe** Opel (2020) recalled all their Ampera e-models (10,000 vehicles) due to battery failures. Ampera is a sister car of the Chevrolet Bolt.
- VW (2021) issued a recall of e-Up! vehicles due to an insulation malfunction of the battery cells.
- Peugeot (2022) recalled EVs manufactured between 15 - 20 January 2020 due to an error in the manufacturing process of the battery.
- Renault (2022) recalled Zoe vehicles that were manufactured between 13 January 2021 and 22 February 2021, due to an internal short-circuit in the battery.
- Mercedes (2022) recalled passenger vans. After a long mileage, a battery-chemical expansion of the battery cells could lead to a short circuit.

Battery-related recalls continued throughout 2022

More battery manufacturers have recently been involved in recalls, with most experiencing at least one recall in the last three years. We expect this trend will continue in the coming years as technology continues to advance, and manufacturers look for alternatives to meet growing demand.



Automation and connectivity – electronic components and software



The number of recalls involving electronic components have been relatively stable since 2015, with around 100 recalls per year (Figure 6). This is significantly higher than the 2009 and 2014 average because today's cars contain more advanced, and complex, electronic safety and comfort features. These features have led to the expansion of software in vehicles with the number of recalls of involving electronic components reaching an all-time high in 2022.

Recalls involving electronic components were classified in two categories:

Hardware-related failures

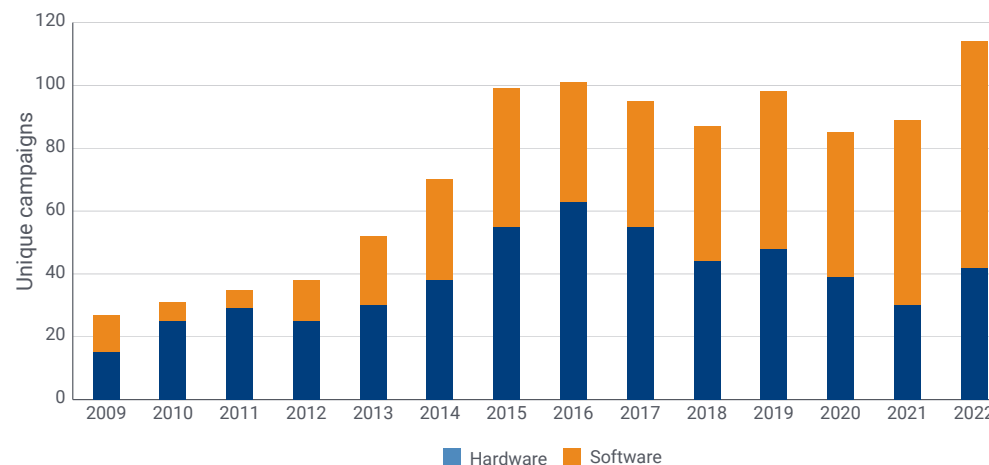
Encompasses the failure of electrical components due to physical defects, including defects related to water intrusion, wiring failure, etc. (these defects are not caused and/or fixed by software).

Software-related defects

Problems with software operation, performance, and reliability, and from software interfacing with other components.

From 2016 to 2021, we saw a significant and steady decline of up to 50% of hardware-related recalls. At the same time, we saw a significant increase of 50% of software-related recalls. This trend is likely to continue.

Figure 6: Unique recall campaigns - electrical components (hardware vs software)



Common hardware defects and most impacted software

2020 – 2023	
64,0000 VEHICLES Average industry recall size	90,000 VEHICLES Average recall size electronic components

The most common hardware defects over the last two years

- ▶ Assembly errors – wrong or misaligned components, physical obstruction/contact between different components or systems (project integration)
- ▶ Water ingress – housing degradation
- ▶ Defective components – in most cases entire control unit replacement was required

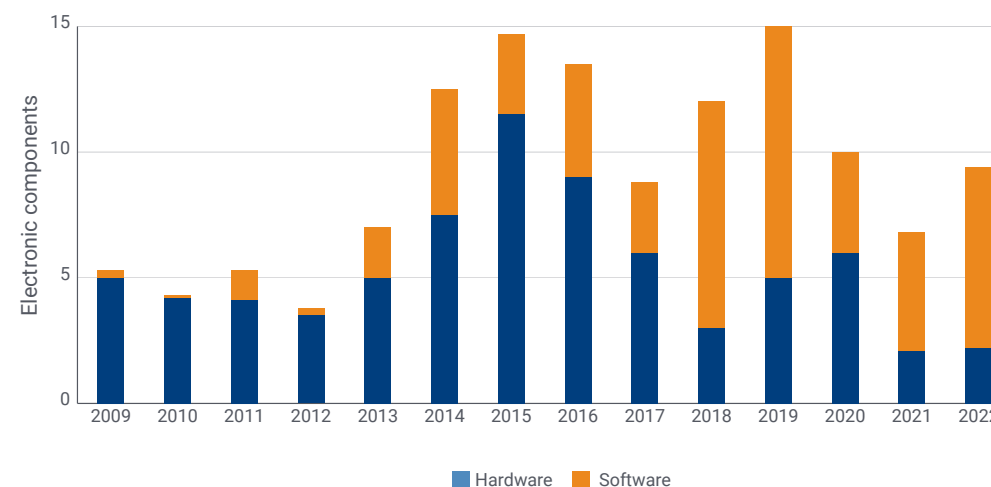
Systems most impacted by software errors

- ▶ Reverse camera – this is by far the most impacted system. Main issues are blank or black screen or infotainment content is displayed instead of the rearview camera image, response time of the display when reverse gear is engaged and image freezes
- ▶ Exterior lighting – adaptive and smart systems
- ▶ Transmission and Engine control units
- ▶ Infotainment system – not complying with safety standards i.e., driver distraction
- ▶ ADAS – Emergency Brake Assistance and park-assistance
- ▶ Airbags control unit – occupant classification systems (failure to identify whether an adult or a child is sitting in the passenger seat)
- ▶ ABS and ESC control module

These systems have evolved rapidly over the last few years, and while most of them being relatively new in mainstream cars, some are being mandated for new vehicles over the last five years.

The drop in the number of vehicles impacted by hardware and software defects is significant, being around 50% lower than the average of six to eight years ago (Figure 7). Even though there are more recall campaigns, these recalls are significantly smaller.

Figure 7: Vehicles affected by electronic components per year (hardware vs software)



Summary

The automotive industry and technology is experiencing change at a dizzying pace. At the highest level, this evolution is characterised by two megatrends, automation and electrification, which are reshaping the industry. Vehicles being equipped with new technologies and materials are integrated to improve vehicle safety and performance.

These innovations have introduced a variety of electronic components and have led to the continued expansion of software. We have seen a significant decline of hardware-related recalls over the last five years, however, there have been no major changes regarding software defects.

Identifying component defects is an ongoing exercise, and OEMs and suppliers are working hard to detect them early, resulting in a higher number of recall campaigns involving fewer vehicles. There is an increasing trend of EV battery recalls. These incidents commonly occur across global platforms, which is expected because EV battery production is heavily concentrated to a few suppliers in specific geographical regions. Incident rates are rising as production is increasing and this trend is expected to continue for years to come.

While defect trends associated with advanced automotive technologies are still emerging, new safety-critical components are increasingly involved in automotive recalls. This trend is expected to continue as such technologies become available in mainstream vehicles and creates challenges when it comes to anticipating future automotive recall trends.



Why Liberty?



Voted the [NIBA 2023 Specialty Insurer of the Year](#), Liberty Specialty Markets (Liberty) offers a breadth of world-class insurance and reinsurance services to brokers and insured clients. We bring value and solutions to more than 26,000 of Asia Pacific's most significant business and government organisations – helping protect what they earn, build or own.

Experts in crisis management

We are experts in crisis management, and have the largest recall team in the country, comprised of experienced underwriters with more than 20 years experience.

Our bespoke policies are tailored to suit the individual needs of clients, covering:

- ▶ Accidental contamination
- ▶ Product defect
- ▶ Intentional impaired ingredient
- ▶ Government recall
- ▶ Alleged contamination
- ▶ Product extortion
- ▶ Malicious product tampering
- ▶ Adverse publicity

* All benefits and covers described in this monitor are subject to the terms of the relevant policy.

Market leading cover and best in class crisis support

Our market leading Contaminated Products Insurance includes Retailers Withdrawal coverage*. This means our policy also covers product withdrawal due to a quality issue with no threat of bodily injury. This fills the significant gap in coverage for many clients who find themselves exposed when their product is subject to a withdrawal from supermarkets due to a quality issue, as opposed to a food safety issue.

24/7 support

You can expect 24/7 support from our dedicated crisis management consultants.

We provide access to leading crisis management consultants, market leading food technologists and PR experts to assist you with the prevention, management and recovery from a product recall event.

Exceptional service, risk engineering and local claims handling

We understand the need for a quick turnaround. Liberty has underwriters in all eastern states and can meet with clients when needed the most.

Our local claims handling is managed out of Sydney by our senior claims specialist, James Paul.

We have a dedicated Risk Engineer, Luis Gonzales, who provides technical support to underwriters regarding risk. Luis is available to meet with your client to help ensure we fully understand your client's business.

Find out more

If you would like to know more about product recalls and withdrawals and the tailored solutions we provide, please get in touch with a member of the [Liberty Crisis Management team](#).



Contact us

If you're looking for more information regarding product recall insurance, please get in touch with our specialist crisis management underwriters.

Sydney

Shelley Devane

Assistant Vice President, Crisis Management
T +61 2 8298 5959
E shelley.devane@libertyglobalgroup.com

Michael Lincoln

Vice President, Crisis Management
Asia Pacific
T +61 2 8298 5958
E michael.lincoln@libertyglobalgroup.com

Melbourne

Keith Bostock

Underwriter, Crisis Management
T +61 3 9619 9832
E keith.bostock@libertyglobalgroup.com

Donna Niblock

Assistant Vice President
Crisis Management & Victorian Branch Manager
T +61 3 9619 9832
E donna.niblock@libertyglobalgroup.com

Brisbane

Bill Hardie

Senior Underwriter, Crisis Management
T +61 7 3235 8808
E bill.hardie@libertyglobalgroup.com

Hong Kong

Joyce Cheng

Assistant Vice President, Crisis Management, Asia
T +852 3655 2685
E joyce.cheng@libertyglobalgroup.com

Singapore

Si Min Tay

Senior Underwriter, Crisis Management
T +65 6622 9191
E simin.tay@libertyglobalgroup.com

Malaysia

Ken Tung

Underwriter, Crisis Management
T +60 3 2082 4000
E ken.tung@libertyglobalgroup.com

 View our office locations

 Meet our Crisis Management team members



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