RCAR

January 2025

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NEWSLETTER

NEWS FROM 15 RCAR INSURANCE RESEARCH CENTRES

IIHS

Vehicle height compounds dangers of speed for pedestrians

CESVIMAP

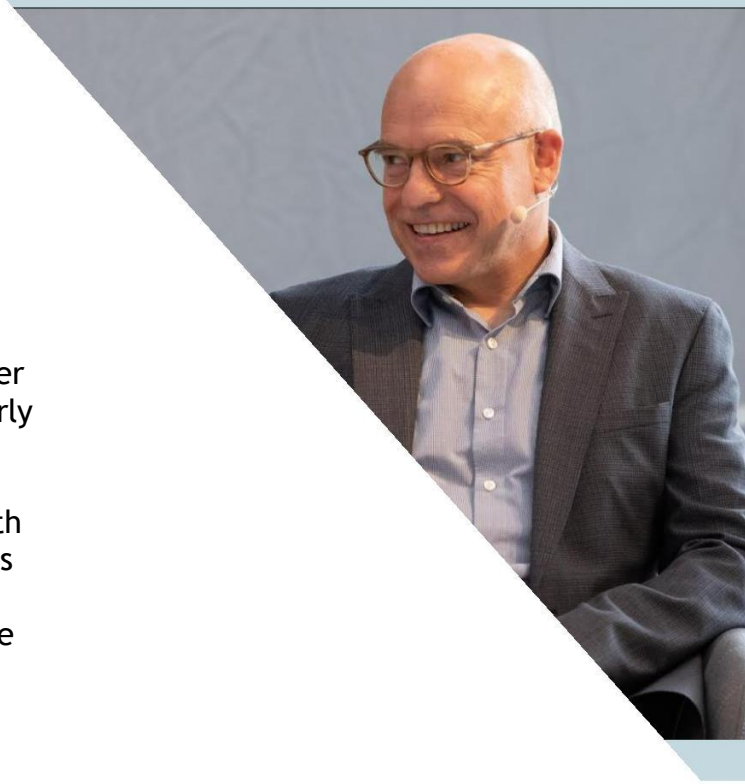
Automotive cybersecurity event

KIDI / KART

Performance evaluation of AEB based on real world accidents

Photo provided by CESVI Colombia

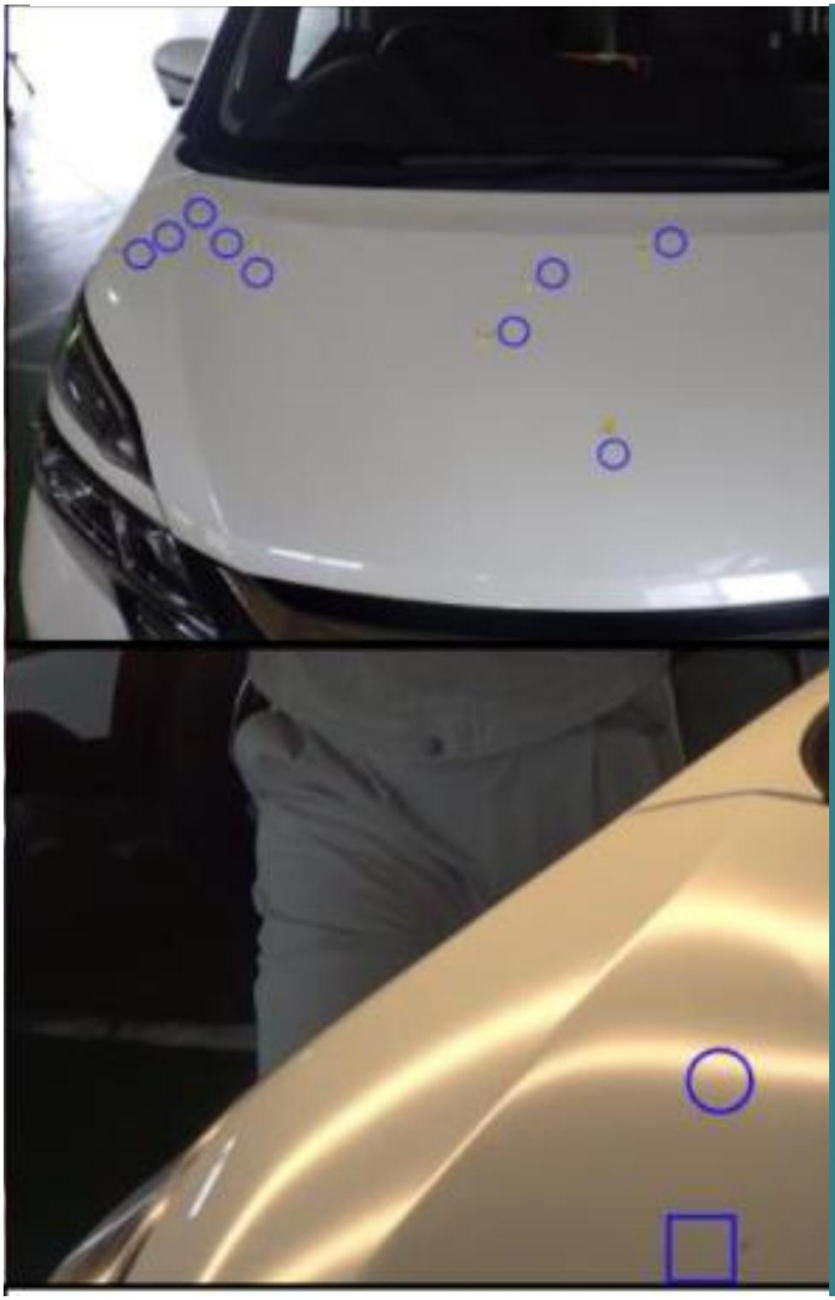
Hello RCAR members.



Dear Members and readers,

I am very pleased to be publishing the RCAR Newsletter for the first time as Secretary General. I am particularly pleased with the large number and quality of contributions. A total of 15 RCAR members have contributed 27 articles. The content shows the breadth of the research carried out by our members, as well as the broad challenges relating to safe, affordable and sustainable mobility. For feedback or questions, please contact me at: clauterwasser@rcar.org

Christoph Lauterwasser



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Thatcham Research United Kingdom

Liikennevakuutuskeskus (LVK), Finland

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CIRI Auto Technology Institute, China

12th Allianz Motor Day: "Big versus Small - How to better protect vulnerable groups in urban areas"

Around 40 percent of fatal road accidents in Europe occur in urban areas. In Germany, 80 percent of the victims in urban areas are pedestrians and cyclists. Heavy vehicles such as trucks and vans pose a major risk to these vulnerable road users and too many people are still injured or killed on the roads. A lot still needs to be done to achieve the goal of "Vision Zero".

For this reason, the topic of the 12th Allianz Motor Day on last October 16 was "Big versus small - How to better protect vulnerable groups in urban areas". Among other things, AZT presented the latest figures from an accident research and an international survey on the subject. One of the key findings was that around one third of all accidents between trucks and vulnerable road users that were investigated could be prevented by already known and established technical improvements - for example by an actively intervening emergency brake assistant in trucks or by an improved line of sight for truck drivers.

Allianz addressed three specific demands to car manufacturers and legislators to better protect vulnerable groups in urban traffic:

1. The safety equipment of vans and trucks must exceed the current legal standard. At least, vans should have the same safety systems as new passenger cars since they are using the same highly frequented urban roads. Truck manufacturers should make full use of the innovations already available to help prevent accidents. These include maneuvering windows, lowered cabs, and automatic emergency braking systems when turning.

2. Allianz advocates a Europe-wide harmonization of requirements and calls on the EU legislators to further improve current regulations. For all new trucks, advanced driver assistance systems to prevent turning accidents should be made mandatory as soon as possible. Warning systems, as currently required by law, are not enough. Active braking systems that detect road users in the blind spot and immediately initiate emergency braking should be mandatory. And these systems must always be switched on.

3. Comprehensive data-sharing as intended in the EU Data Act is needed: if Allianz, as an insurer, knows which safety systems are installed and activated in trucks and vans, Allianz can set risk-based rates and incentives.

For the live recording of the event please follow this link: 12. Allianz Autotag / 12th Allianz Motor Day

Speakers and panelists of 12th Allianz Motor Day

In the course of this year's Allianz Motor Day, we tested a new approach together with our colleagues from the marketing department. The contents of the Motor Day were not only prepared for press representatives, but also explicitly for young people of Generation Z. Various contents were produced in collaboration with content creators and Twitch streamers well-known in Germany such as Daniel Abt, SkylineTV Live and Shlorox and these contents were shared via social media. The reach of the formats was very good and the response was positive – a successful test for future use cases.
One of the results of the activation of the target group of young people can be seen here: Daniel Abt @ AZT

Towing standard for high voltage vehicles

In 2023, reports of excessive towing charges for high-voltage vehicles increased at the hotline of AZT. Allianz experts reported that towing companies refused to release HV vehicles towed from accident sites until exorbitant storage fees and additional costs for handling of these vehicles were paid. Particularly notable were businesses that cooperated with the German Motorists Association ADAC.
Thereupon AZT sought dialogue with ADAC Service GmbH to find a solution to the problem. ADAC presented a draft with recommendations for partner companies, which AZT critically reviewed. The draft was criticized for unsuitable suggestions for assessing the criticality of crashed HV vehicles, portraying qualification standards established by professional associations as inadequate, and the significant personnel efforts required.
In June 2024, a meeting took place to discuss the issues. However, ADAC presented a revised version of the document without considering AZT's comments. At the beginning of August, AZT received this new version, which turned out to be complementary to an application for a RAL quality mark for towing HV vehicles. This application was forwarded to AZT for comment by the German Insurance Association (GDV) almost simultaneously.
It became clear that ADAC was part of a larger plan aimed at creating elaborate standards, ultimately at the expense of insurers and consumers. A group of towing companies is trying to establish a quality mark that disadvantages smaller companies in the market. These towing companies argue that only they are capable of handling, assessing, disposing of, and scrapping crashed HV vehicles. However, their requirements contradict

existing regulations. For instance, as mentioned above, training according to the German Social Accident Insurance (DGUV) is considered inadequate, and the vehicle type approval is deemed void after an accident. Additionally, the battery is no longer compliant with UN38.3, making it hazardous material that must be immediately removed at the accident site.

There have been several reports of cases where even the vehicle manufacturer was not allowed to retrieve an HV vehicle under pretexts. The goal appears to be to achieve the highest possible quarantine and storage fees. While the average towing cost for a combustion engine vehicle is about € 580, costs in these cases on average doubled and some reached up to € 20,000. An AZT analysis of 126 towing invoices showed that towing companies and groups advocating the aforementioned requirements had a significant share in this cost explosion.

The issue was already presented in April 2024 at a working group meeting of the German Association of the Automotive Industry (VDA) and the Association of International Motor Vehicle Manufacturers (VDIK). A project group in the VDA's "Rescue" working group was also initiated by AZT at the end of August 2024 to address the problem. This group currently formulates the correct technical requirements for recovery and towing, so they will be available within a few months as an appropriate VDA information to all parties involved, from fire departments and police to towing companies and repair shops.

This effort, like the definition of VDA standards for quarantine areas in 2022, aims to create more safety in the claims process and keep costs for our customers within a reasonable range.

More information:

- Explanatory Film to Towing of HV Vehicles
- VDA/VDIK: Technical quarantine areas for damaged vehicles with lithium-ion batteries

CESVI Colombia made the first crash test on motorcycles

In Colombia, the vehicle fleet is made up of more than 19.8 million registered vehicles; motorcycles represent 60% of the total number of vehicles, with a figure of 11.9 million. In second place, are vehicles in the segment of cars, vans. trucks and buses, which represent 39% of the country's vehicle fleet, with nearly 7.7 million units, and the remaining 1% corresponds to yellow machinery, trailers and semi-trailers.

In addition, motorcyclists are the road actors with the highest accident rate in Colombia; according to governmental entities, motorcyclist fatalities correspond to 61% of the total number of deaths in traffic accidents. In November 2024, the National Road Safety Agency (ANSV) indicated that out of 7,396 users who have lost their lives in traffic accidents, 4,537 were motorcycle users.

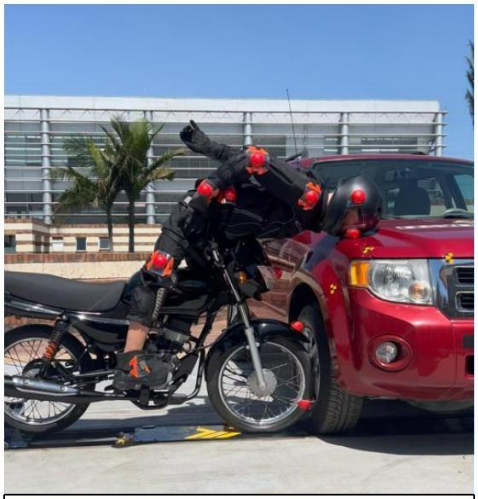


Image 1. Behavior of a motorcyclist in a collision event.

According to data obtained by the ANSV, the most representative type of crashes is between motorcycle and vehicle, with about 9,840 accidents, equivalent to 59% of all accidents. In these cases, and according to CESVI Colombia's Traffic Accident Reconstruction Area (RAT), there are more cases between cars and vehicles, where the motorcycle impacts the vehicle perpendicularly, a condition that occurs when both arrive at intersections or corners and one of the two road actors does not respect the stop signs or traffic lights, impacting the front side of the vehicle, at the height of the front fender of the car.

This test was based on the ISO standard 13232: "Motorcycles: Test and analysis procedures for the evaluation of motorcycle crash protection
devices installed on motorcycles" as a reference. The implication of requirements such as:

- The two-wheeled motorcycle and the specifications of the vehicle to be impacted.
- One vehicle stationary and the other in motion.
- A constant velocity and straight-line motion before impact.
- A dummy with a helmet placed in a driving position on the seat.

For this purpose, CESVI Colombia made an adaptation to ISO standards, where the speed condition of the test is redefined, considering the speed of circulation in urban perimeters, which cannot exceed 30 km/h. The test also included a dummy with additional personal protection elements, such as a jacket with shoulder, elbow and back protection, pants with waterproof materials, gloves with knuckle protection, and high boots to protect the lower extremities. These are the elements recommended by ANSV to improve the protection and preservation of motorcyclists.

Image 2. Crash Test Development - CESVI Colombia

Results

With the development of the motorcycle crash test, CESVI Colombia seeks to have a positive impact on the following aspects.

1. Development of computational simulation models with multi-body dynamics to determine the injuries and severity of the damage caused to the motorcyclist. For this purpose, pointers were installed to capture the reaction of the body in the event of a collision. On the other hand, with the computational model it will be possible to obtain the result at different speeds by means of the simulation to determine the damages and injuries at different speeds of circulation of the motorcycle.
2. With the real results of the different tests that CESVI Colombia is carrying out, the structural affectations of the vehicles will be analyzed, where with the simulation models at different speeds the possible damages that a motorcycle and a collided vehicle would present will be determined. This is an important input for the RAT area of CESVI Colombia to establish the probable causes of traffic speeds based on the damages evidenced on the vehicles.

3. Implement high motorcycle and rider safety standards.

On the motorcycle

The installation of anti-lock brakes (ABS or CBS), dynamic controls to maintain control of the motorcycle in emergency conditions, such as stability control (ESC), certified tires, and daytime running lights (DRL) that allow them to be visible at all times.

To the motorcyclist

Improve safety standards in equipment; currently, only helmets certified by ECE and DOT are required, where the use and requirement of protective elements such as: jackets with chest and back protection, gloves and elements that protect the upper extremities; safety pants and boots that cover and protect the lower extremities are recommended.

Image 3. Damage to the motorcycle and injuries to motorcyclist

Strengthen preventive and defensive driving skills, promoting a culture of road safety and influencing driving training for motorcyclists. Additionally, increase the rigor for the issuance of driver's licenses by government agencies, including specific evaluations that support the ability of the person to perform the activity of driving this type of vehicle.

CESVIMAP and DEKRA organize an Automotive Cybersecurity event

CESVIMAP and DEKRA, in collaboration with the Automotive Security Research Group (ASRG), organized a Car Hacking event at the University of Malaga.

Cybersecurity experts and attendees had the opportunity to learn how to access modern car systems with the appropriate knowledge and tools, putting their skills to the test in identifying vehicle vulnerabilities.

Starting with open wireless interfaces, Key Fob attacks were conducted using Replay Attack techniques, allowing the doors and trunk of the vehicle to be opened using an SDR. Through Bluetooth, unauthenticated Keystroke injections were performed on the infotainment system, disabling critical systems such as Advanced Driver Assistance Systems (ADAS).

At a second level, open wired interfaces (OBD, USB, SD card, etc.) were analyzed, accessing debugging systems like ADB to execute shells, establish persistence, and escalate privileges. Reverse engineering tasks were also carried out on infotainment system applications.

Finally, closed wired interfaces were analyzed, including ECUs and the various internal vehicle buses such as Body Network, Chassis Network, and Power Train Network. Using Service Manuals and a multimeter, CAN lines accessible from outside the vehicle were identified, and some intrusions were performed.

Cybersecurity in the automotive sector has become a necessity in recent years, especially due to the impact of technology and the digitalization of the industry. If a car does not meet minimum cybersecurity criteria, it can face multiple threats that not only affect critical functions—such as brakes or steering systems—but can also lead to the leakage of personal information, impacting the car's performance and safety systems.

As MAPFRE's innovation center, CESVIMAP plays a fundamental role in identifying these threats. Their work in identifying vulnerabilities and security measures contributes to road safety, warning vehicle and equipment manufacturers, as well as other users, about potential risks. Exploring vehicle cybersecurity strengthens consumer confidence in emerging technologies, ensuring that technological advancements are implemented safely and effectively, allowing MAPFRE to offer specific coverages based on their research.

CESVIMAP launches“Tu Oportunidad” project

CESVIMAP has launched the pilot project "Your Opportunity," a transformative proposal aimed at training individuals outside the in-person aftermarket sector in a productive manner to develop their skills for working in a vehicle maintenance or repair workshop. "Your Opportunity" offers them an employment contract from the first day of the course; this employment commitment provides the necessary economic stability, while the intensive training program develops their skills for professions such as panel beater in the first course developed in 2024, and in the future, for basic-level painter or mechanic roles.

Given the shortage of human talent in the automotive aftermarket sector -as in many other sectors- "Your Opportunity" is a value proposition developed by MAPFRE and CESVIMAP, designed to bring new professionals to vehicle repair workshops with enabling knowledge.

This is a unique opportunity for employment and professional development for these 9 individuals hired from the beginning of their training, and who, by being trained in a tailored and in-person manner at CESVIMAP's facilities, are effective as soon as they arrive at the employer's workshop. That represents an invaluable option for participants, but also for the automotive aftermarket, which is currently facing a talent shortage. According to the annual report by ANFAC, the Spanish Association of Automobile and Truck Manufacturers, the automotive sector represents 2.7% of Spain's GDP, generating more than 150,000 direct jobs.

However, the lack of qualified professionals is a constant challenge and currently one of the main headaches for independent workshops and dealerships. CESVIMAP reaffirms its commitment to social inclusion and professional development, offering a pathway to improve people's quality of life while positively contributing to the automotive aftermarket sector. Various social entities have collaborated in the search for candidates, and several repair associations have provided participants with employment in their workshops.

In 2025, the second edition of "Your Opportunity" will train panel bodyworkers and painters.

CESVIMAP celebrates the training of its 100.000th student

Since its founding 41 years ago, CESVIMAP has established itself as a global reference technology center for the design, insurance, repair, and recycling of vehicles. It also trains various profiles for the positions required in the automotive aftermarket. In 2024, it reached the record figure of 100,000 trained students, a milestone that underscores its commitment to excellence in training and innovation in the automotive sector.

CESVIMAP works closely with manufacturers, dealerships, workshops, rental and sharing companies, importers, distributors, suppliers, and law enforcement agencies. It provides comprehensive training to all of them, covering different professional profiles in the automotive sector: managers, workshop managers, receptionists, panel beaters, painters, electromechanics, and teachers of secondary education and

vocational training. It also designs customized training plans for companies according to their needs and offers specialization courses in appraisal, aftermarket management, traffic accident reconstruction, fires, etc.

Throughout its history, CESVIMAP has delivered more than 6,000 courses, both in-person and online; these include university programs resulting from the CESVIMAP Chair at the Catholic University of Ávila. This record figure reaffirms CESVIMAP's commitment to quality training and continuous innovation, contributing to the development of safer and more sustainable mobility.

CESVI SAFE: A Digital App for Road Safety Self-Analysis

In 2024, the road safety division of CESVI MÉXICO developed CESVI SAFE, a digital application designed for transportation companies to self-evaluate ten key aspects of their internal processes related to accident prevention.

Road safety is a critical concern for fleets, as it directly affects both the company's profitability and the well-being of employees and the public. With CESVI SAFE, the following objectives are pursued:

- Reduce the risk of accidents and injuries
- Comply with accident prevention and asset protection regulations
- Enhance corporate reputation among the public
- Promote employee well-being
- Reduce costs
- Achieve operational efficiency
- Maintain corporate social responsibility
- Prevent claims and lawsuits stemming from traffic accidents


INFORME PARA LA DIRECCIÓN

A continuación, se presenta el reporte del diagnóstico de Seguridad Vial. Se realizó el diagnóstico tomando como criterio la norma ISO 39001:2012, y la documentación y evidencia de la gestión de la seguridad vial.

Indicador	Puntaje máximo	Puntaje obtenido	Estatus
Estrategia	100	87	87%
Personas	100	56	56%
Emergencias y marco legal	100	73	73%
Evaluación del desempeño	100	85	85%
Road Safety Management	100	83	83%
Vehículos	100	60	60%
Administración de la seguridad vial	100	88	88%
Comunicación y equipamiento	100	58	58%
Operaciones	100	90	90%
Gestión de la operación	100	75	75%
Total	1,000	755	76%

Como resultado del diagnóstico se detectaron áreas de oportunidad para sistematizar e implementar controles en la seguridad vial basado en los requisitos de la norma ISO 39001, se requiere trabajar en las brechas importantes para tener un sistema de gestión que garantice a la organización la implementación del SGSV (Sistema de Gestión de Seguridad Vial).

CESVI MÉXICO

CESVI SAFE is a web application available to any company operating a fleet of motorcycles, cars, general cargo transport, specialized and hazardous materials transport, as well as passenger transport. Thus, it covers all sectors of human and product mobility.

"When an organization uses the CESVI SAFE application, it receives a diagnostic assessment and a safety score for its fleet. The organization will also receive recommendations for improvement or can opt for personalized consultancy services to implement effective changes," explained Jorge González, Director of Operations at CESVI.

"With CESVI SAFE, time and money are saved; previously, CESVI had to send a consultant to conduct an on-site diagnosis, gather evidence related to road safety, analyze documentation, and provide a report. This process took about a week, whereas it now takes just minutes to upload the necessary information into CESVI SAFE," clarified Alfredo Alcántara, Road Safety Manager.

CESVI SAFE poses critical questions regarding various aspects of fleet management and road safety. By answering these questions, organizations receive a report that identifies areas for improvement, in accordance with the ISO 39001 standard.

Tecnológico de Monterrey and CESVI MEXICO Forge Strategic Alliance

CESVI Signed training partners Agreement with Tec de Monterrey, Toluca Campus

CESVI MEXICO and Tecnológico de Monterrey's Toluca campus have officially signed a Training Partners Request Letter to formalize a strategic collaboration. This agreement aims to promote partnership in academic projects, challenges, internships, and talent development across various areas of mutual interest.

The document was signed by CESVI's CEO, Augusto Bagase Rejon, and the Principal of Tecnológico de Monterrey Toluca campus, Claudia Gallegos Cesaretti.

The goal of this alliance is to bridge the gap between industry and academia, creating synergies that foster innovation in road safety and intelligent mobility.

The signing event was attended by several representatives from the Tec Toluca campus, including Dr. Omar Olmos López, Director of the School of Engineering and Sciences Division; Mto. César Armando Vega Torres, Leader of the Center for Linkage and Professional Development; and Dr. Fernando Ruiz, a mechatronics professor and project leader on “Probability of Injuries According to Deceleration Data in Impacts.” CESVI was represented by Jorge Fernando González Miranda, Director of Operations, and Galileo A. Molina López, Deputy Director of Services.

The key benefits of this agreement for both parties are as follows:

For CESVI MEXICO: "This collaboration will enable us to access the talented young students from Tech de Monterrey and establish partnerships on research projects that enhance our leadership in electromobility, repair, and safe mobility."

For Tec de Monterrey: "This agreement will provide Tec students and faculty with opportunities to engage in real, innovative projects that directly impact the industry, facilitating the development of new technological solutions for road safety."

It is noteworthy that this alliance has already produced results. During a recent impact test session at CESVI MEXICO's facilities, Tech students installed accelerometer devices they developed to measure the likelihood of injuries to vehicle occupants in the event of an accident.

These students not only collected valuable data but also applied their knowledge in real scientific tests of low- and mid-speed crash scenarios, in accordance with international standards set by RCAR.

Additionally, they had the opportunity to present the characteristics and objectives of their project to executives from an insurance company, demonstrating the agreement's success in connecting students to real-world work environments.

As we look ahead, CESVI MEXICO and Tec de Monterrey are excited to announce a collaborative effort on 10 innovative projects:

- Developing phase 2 of energy-generating speed bumpers
- Exploring the second life of EV batteries
- Automating ADAS system testing procedures
- Recruiting a design engineer for FEA analysis
- Optimizing CDR visit routes digitally
- Conducting a second phase of accelerometer studies to assess injury probability
- Calculating speed based on material deformation
- Utilizing 3D printing for repair kit manufacturing
- Automating the Workshop Comparison Tool
- Building an instrumented dummy for injury research.

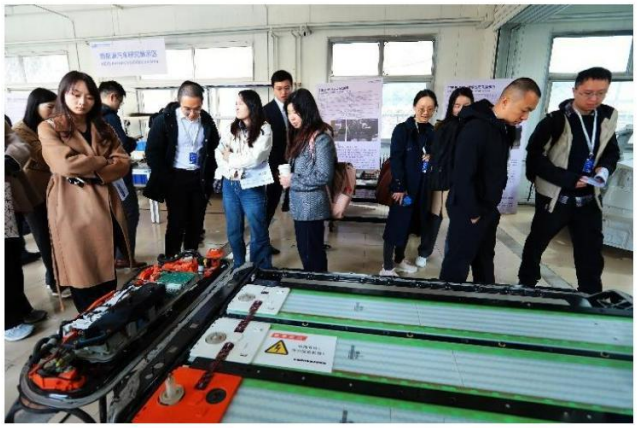
CIRI Holds Investor Open Day for PICC P&C

On November 8, 2024, PICC P&C Investor Open Day was held by CIRI Auto Technology Institute in Beijing, attracting around 200 attendees from various sectors. The event highlighted CIRI's latest achievement on automotive insurance field and offered a comprehensive overview on automotive insurance for all attendees.

President Shulin Liu began by introducing CIRI's history, research activities, insurance risk reduction efforts and the progress of the establishing of China's vehicle insurance rating system. CIRI provides precise risk data gathered from those activities to help insurance companies improve the competitiveness and market adaptability of their products.

Attendees visiting the repair testing workshop

The attendees then toured the crash test laboratory, observing a 15 km/h structural crash test, which assesses vehicle low-speed safety performance and serves as the basis for insurance premiums and claim standards. Next, they visited the repair testing workshop, where research on repair costs and labor hours was presented, aiding insurance companies in optimizing claims processes and reducing costs. They also explored the AEB test area, where low-speed collision scenarios were simulated to evaluate vehicle AEB performance and provide risk assessment data. Finally, they visited the damageability & repairability display area, which showcased the differences in repair costs across vehicle models and facilitated feedback on design flaws to manufacturers, promoting improvements in vehicle D&R performance.



Attendees visiting the D&R display area

The success of the Open Day not only demonstrated CIRI's strong capabilities and innovation in the automotive insurance sector but also received high praise from shareholders and investors. They acknowledged CIRI's efforts and achievements in advancing industry development and enhancing the competitiveness of insurance products. The event provided investors and the broader community with an in-depth understanding of CIRI, further solidifying its professional position and influence in automotive insurance. CIRI will continue to organize open events to raise awareness of automotive insurability, foster the sustained healthy development of both the insurance and automotive industries.

CIRI Holds Expert Review Conference for C-IASI EV Power Battery Specific Evaluation Protocol in Beijing

On October 29, 2024, the C-IASI EV Power Battery Specific Evaluation Protocol Expert Review Conference was held in Beijing, with over 80 experts in attendance. The experts discussed the revisions

to the evaluation protocol for EV and unanimously agreed to approve the protocol for finalization and public release.

Currently, China's EV industry is experiencing rapid growth, but its technological framework differs significantly from ICE vehicles, especially with the introduction of power battery systems, which present new insurance challenges. The issues of power battery damage, difficult repairs, and high claim costs have become common concerns within the insurance industry. To protect consumer rights, C-IASI will implement special evaluations for EV power batteries, collaborating with the insurance and automotive industries to strengthen data accumulation, explore multidimensional data, address issues in insurance claim settlements and safety during use, and promote high-quality industry development.

During the development of the C-IASI EV Power Battery Specific Evaluation Protocol, CIRI extensively sought input from insurance industry experts and incorporated practical experience from frontline professionals. At the same time, CIRI engaged in deep collaboration with automotive manufacturers. This initiative aims to ensure that the new guidelines meet the current practical needs of the insurance industry while aligning with the technological capabilities and standards of automotive companies. The implementation of the new protocol will help guide automotive manufacturers and R&D teams to place greater emphasis on the damageability, repairability, and other insurance-related performance characteristics of EV power batteries. This will effectively reduce the risks associated with EV and address the challenges currently faced by the insurance industry in insuring these vehicles.

President Shulin Liu giving speech

Starting from March 2025, the C-IASI EV Power Battery Specific Evaluation Protocol will be officially implemented, and the evaluation results will be made publicly available. Moving forward, CIRI will continue to monitor the development of the EV industry, deepen its research on technologies and standards, and contribute to the advancement of the automotive insurance sector.

Centro Zaragoza successfully concludes its VIII Conference on Impact Biomechanics

On October 24th, Centro Zaragoza, in collaboration with the Centro Zaragoza Chair at UNIZAR, hosted the "VIII Conference on Impact Biomechanics."

The event brought together representatives from most automobile insurance companies, as well as key figures from the legal and medical sectors specializing in automobile claims and the assessment of personal injuries.

Targeted at professionals in the insurance and road safety sectors, the conference addressed highly relevant topics through a series of specialized presentations that offered a multidisciplinary perspective—a crucial approach to fostering innovative solutions in road safety.

The overall feedback from attendees was highly positive. Road safety challenges can only be effectively addressed through a multidisciplinary approach, where expert knowledge drives solutions to reduce accidents and streamline damage resolution processes.

Room at ht University of Zaragoza

Folksam

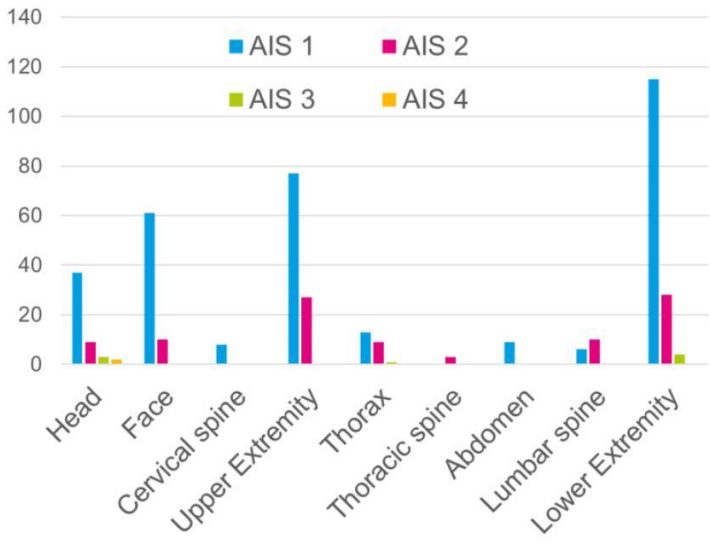
Crashes of E-Scooters with Passenger Cars

E-scooter crashes involving passenger cars are a concern in many urban areas where e-scooters have become a popular mode of transportation. E-scooter riders involved in crashes with passenger cars are at higher risk of sustaining severe injuries compared to single crashes. Head injuries are of particular concern. In Sweden, the focus has primarily been on single-e-scooter crashes as they are most common.

Data from the Swedish Traffic Accident Data Acquisition database, the national system for road traffic injury data collection, was used to study crashes related to e-scooter use in Sweden between 2020 and 2022. Between 2020 and 2022, there were a total of 613 e-scooter crashes involving a passenger car in Sweden, as reported by the police. Out of these crashes 363 took place at intersections, 236 on road sections and 13 at parking lots or on sidewalks.

The table below shows a summary of the descriptive findings.

- 61% crossing traffic
- 19% while driver made left or right turn
- 69% in daylight
- 66% dry road surfaces
- 75% in fair weather conditions
- 60% on zebra crossings
- 70% hit by a passenger car, 17% into a car
- 63% males with average age 25
- 36% sustained Maximum MAIS2+ injuries



In total 71% of the e-scooter riders were slightly injured, 12% moderately, 2% severely and one fatally injured. For 186 riders, hospital data could be retrieved. Of these, 36% sustained AIS2+ injuries. Injuries to the lower and upper extremities dominated the injured body regions (253/435 injury diagnoses) followed by injuries to the head and face, see figure to the left.

Crash characteristics appear favourable to develop vehicle safety systems like Automated Emergency Braking (AEB) to mitigate crashes with e-scooters. Straight crossing path scenarios were common and AEB systems are more mature in addressing these compared to turning. Still, AEB systems might face difficulties in detecting e-scooters. The data suggests prioritising scenarios where a car goes straight and hits a e-scooter with its front at intersections and on zebra crossings.

In line with previous research, head injuries remain most prevalent at the highest injury severity and are therefore a priority for prevention. Helmets are effective in preventing injuries in bicycle crashes and likely also to mitigate injuries in e-scooter crashes. However, impacts to the face, which is typically not protected, are a concern requiring further protection.

For more details in the study: H. Stigson, A. Kullgren, N. Lubbe. Descriptive Statistics on Crashes of E-Scooters with Passenger Cars in Sweden. IRCOBI, 2024

Important recognitions for the project "Influence of driving style on fuel consumption and CO_2 emissions."

The matter of climate change and the reduction of pollutant emissions is increasingly in the spotlight, particularly regarding the transportation sector, which is responsible for 25% of CO_2 emissions into the atmosphere.

A crucial study by Generali jeniot in collaboration with the Polytechnic of Milan has calculated that less aggressive driving, as identified through jeniot's black box, reduces both fuel consumption and CO_2 emissions, while increasing road safety (and allowing the customer to save money on policy renewal).

In 2024, this study received two important industry recognitions: it was awarded at both the *Italy Insurance Forum* and the *Insurance Connect Awards*.

The 11th edition of the *Italy Insurance Forum* was held in Milan in May 2024 and represents the annual reference event for the insurance sector in Italy, with over 600 participants and 40 insurance companies attending the latest edition. In this context, national and international case studies were presented. Jeniot won the award for the best ESG (Environmental, Social, and Governance) project, "*for developing a simulation model capable of analysing the correlation between driving style, CO_2 emissions, and economic savings*".

Alberto Busetto, CEO & General Manager of Generali Jeniot, during the award ceremony at the Italy Insurance Forum.

In November, another recognition was received during the gala evening in Milan for the *Insurance Connect Awards*, an event aimed at companies, intermediaries, and third parties, which have distinguished themselves for noteworthy strategies, innovation, vision, communication, products, and services. In a room filled with over 220 industry professionals, Generali jeniot won the award for the "*Best project supporting sustainability – mobility*".

Another recognition during the gala evening at the Insurance Connect Awards.

But what made jeniot's research unique compared to other case studies? Having implemented the real-time coaching system for its telematics customers with the aim of reducing the risk of driving accidents, the next step was to understand if encouraging drivers to improve their driving style would also generate environmentally friendly practices-by reducing fuel consumption and consequently emissions.

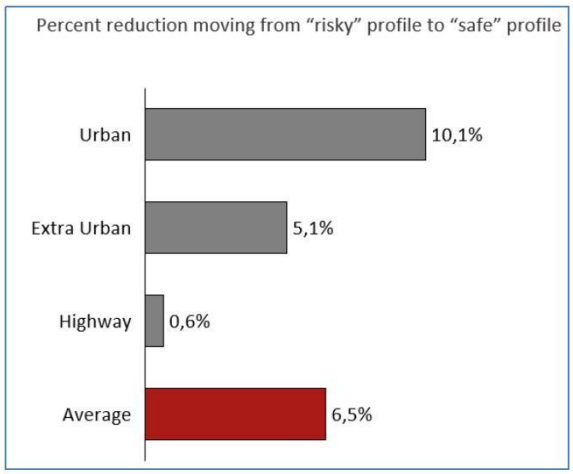
The study involved the use of data recorded from about 700,000 vehicles of Generali's telematics portfolio and the implementation of digital twins of the vehicles. For each car, an average annual mileage of 10,000 km was estimated (divided into 4,200 km/year for urban routes, 4,300 km/year for extra-urban roads, and 1,500 km/year for highways).

The study was developed by two professors from the mechanical department of the Polytechnic of Milan together with the research and the data analytics teams of Generali jeniot. Great efforts were put into creating a driving profile starting from the WLTC approval cycle and modifying it based on the data stored in Generali jeniot's "IoT platform", to reproduce the behaviours identified by the proprietary driving style assessment algorithm. Additionally, specific research was conducted in the global emissions assessment, which evaluated the entire WTW (Well-To-Wheel) process and thus also took into consideration the processes of extraction, production, and transport of the various energy carriers.

The study showed how the indications provided to drivers on their driving style, thanks to the black box and the real-time coaching function, encourage the insured not only to drive more safely but also in a more sustainable way.

Presenting the main results in summary form:

- a saving of more than 2,300 tons of CO_2 per year was calculated thanks to the improvement in driving style.
- the results naturally vary based on the type of route (urban/extra-urban/highway) and the class of vehicle (ranging from city cars to SUVs), but overall, on average, the improvements between a cautious driver and an aggressive one are -6.5% CO_2 and -85€ in fuel costs in a year.
- additionally, thanks to the drive coaching, every year a portion of aggressive drivers improve their driving style, reducing the risk of accidents.



Reduction of fuel consumption and CO_2 emissions from risky driving to safe driving

This data underscores the importance of promoting responsible and conscientious driving behaviour to contribute to the fight against climate change. It is planned to soon integrate these kinds of calculations related to CO_2 savings into jeniot's touchpoints (mobile app and customer report).

The project represents a tangible example of how collaboration between industry and academia can lead to significant results and help solve the complex challenges that characterize today's automotive and ESG sectors. It also confirms the value of Generali jeniot's commitment to integrating sustainability and innovation, with the aim of offering solutions that have a positive and concrete impact for the benefit of customers, society, and the environment, through the adoption of sustainable solutions to mitigate the environmental impact of our activities, thus fully aligned with Generali's "*Lifetime Partner*" ambition and the United Nations *Sustainable Development Goals*.

After the conclusion of the project, a scientific paper ("*Effect of Different Driving Styles on Energy Consumption and CO_2 Emission*") was published by IEEE and the results of the study were communicated to Generali's customers through various touchpoints.

Australia will welcome at least 14 new vehicle manufacturers by the end of 2025.

The Australian new car market is experiencing significant changes, with at least 14 new brands expected to arrive in 2025 or having arrived by the end of 2024. In 2024, Australians purchased 1.24 million new cars, and these new vehicle brands will be competing against over fifty established brands.

Most of these new vehicle brands entering the Australian market are from China, along with some from the United States.

Australia has become a popular export market for Chinese vehicle manufacturers due to increasing consumer awareness, cost competitiveness, tariff reductions from the Australia-China Free Trade Agreement, and tariffs imposed by the EU on Chinese-made electric vehicles. BYD have seen phenomenal success, now ranked 16th in new vehicle sales and expected to be a top 10 brand in 2025.

The Australian new car market is also mature and profitable, with Australians purchasing a large proportion of higher end vehicles. Sales of EVs have grown as well and now make up 10% of new vehicle sales (EV & PHEV).

As these brands enter the market, we are focussed on establishing relationships with each brand and for each new model, we provide Vehicle Risk Insights (VRI) to our pricing divisions on the following:

- **Parts pricing and supply:** We review pricing of a basket of common crash parts, relative to the vehicle's market value and track parts movement over time.
- **Repair network:** We provide guidance to each on the most appropriate and cost effective repairers.
- **Repair methods and vehicle construction:** We follow the RCAR New Repairability Design Guide, to rate each model on their damageability and repairability.
    - *We have noted that many Chinese OEMs do not offer short section repair methods and also require large & expensive parts to be purchased for relatively small repairs.*
- **Advanced Driver Assistance Systems (ADAS):** We rate ADAS effectiveness and provide scoring by model and equipment level.
    - *We are working with the University of Sydney to develop a tool to better measure ADAS quality across vehicle makes. We are concerned that some new brands will offer ADAS technology, but the effectiveness of it, and the driver interface, will not be of acceptable quality to reduce road accidents.*

A Research Project on Advancing Fire Safety in Electric Vehicles and Micro-mobility

IAG Research Centre, Australia

As the adoption of electric vehicles (EVs) and micro-mobility solutions (electric scooters and electric bikes) continues to rise, ensuring their safety becomes increasingly crucial. Our latest research project is dedicated to improving understanding about fire risks in EVs and micro-mobility devices, and busting myths about fires (especially for EVs).

The primary objectives of this project are to develop a comprehensive best practice guide for Lithium-Ion Battery (LIB) storage and to identify strategies for mitigating fire risks. The project started in November 2024, together with the Queensland University of Technology, and will be completed in early 2026

Key Research Objectives:

1. **Investigate EV & micro-mobility fire risk during charging and strategies to mitigate the risk.** Charging is a critical phase for EVs and micro-mobility devices, where the risk of fire can be significant. Our research aims to identify and implement effective strategies to mitigate these risks, ensuring safer charging practices.
2. **Evaluate the fire risks associated with dismantled or removed EV and micro-mobility batteries.** Batteries that are no longer in use or have been removed from vehicles pose unique fire risks. We will evaluate these risks and develop guidelines for safe handling and storage of dismantled batteries.
3. **Analyse the impact of weather exposure and chemical product interaction on the fire risks.** Environmental factors such as weather exposure and interactions with chemical products can influence the fire risks of removed EV batteries and micro-mobility devices. Our research will analyse these impacts to provide a clearer understanding of how to manage these risks effectively.
4. **Determine how the state of battery health influences the risk of fire in EVs.** The health of a battery might play a significant role in its safety. We will investigate how different states of battery health affect the likelihood of fire, aiming to establish maintenance practices that enhance safety.
5. **Investigate the correlation between vehicle age and fire risk.** As vehicles age, their components, including batteries, may become more prone to fire risks. Our research will explore the relationship between vehicle age and fire risk, providing insights into how to manage older EVs and micro-mobility devices safely.
6. **Develop the best practice for battery storage for LIB.** Proper storage of Lithium-Ion Batteries is essential for preventing fires. We will develop best practices for LIB storage, ensuring that these batteries are stored in a manner that minimizes fire risks.

We believe that this research will significantly contribute to the safety and reliability of EVs and micro-mobility solutions. We welcome suggestions and contributions from others to guide the research, which is now underway. Please contact Shawn Ticehurst on shawn.ticehurst@iag.com.au

Service campaign cuts Hyundai, Kia theft rates

A window sticker provided with the software upgrade

A software upgrade offered to the owners of Hyundai and Kia vehicles that were sold without electronic immobilizers cut theft rates by more than half, new research from the Highway Loss Data Institute (HLDI) shows.

The companies began implementing the software upgrade in February 2023 in the wake of a tidal wave of theft claims that started during the COVID-19 pandemic, when instructional videos on social media kicked off a viral trend. With the new software installed, vehicles will only start if the owner's key or an identical duplicate is in the ignition. Vehicles with the software also receive a window sticker aimed at deterring potential thieves.

Roughly two dozen 2011-22 Hyundai and Kia models are eligible for the upgrade. Those vehicles that received it as of December 2023 — a total of 30% of the eligible Hyundais and 28% of the eligible Kias in HLDI's database — had theft claim frequencies that were 53% lower than vehicles that didn't get the upgrade, HLDI found.

Those claims aren't all for thefts of the entire vehicle. They also include claims for damage to vehicles that were stolen and recovered, theft of vehicle parts and items stolen from inside the vehicle. The frequency of whole vehicle theft fell by a larger 64% for vehicles with the upgrade.

Electronic immobilizers were standard equipment on only 17% of 2011 Hyundai and Kia models, compared with 92% of 2011 models from all other brands. While that percentage climbed rapidly after model year 2015, even in model year 2022 immobilizers were standard on only 84% of Hyundai and Kia models, compared with 96% of models from other brands. (By 2023, electronic immobilizers were standard on all the companies' models.)

Most small SUVs perform well in rear autobrake evaluation

Seven out of eight small SUVs tested by the Insurance Institute for Highway Safety (IIHS) performed well in the rear crash prevention evaluation, which addresses low-speed backing crashes that account for a large portion of insurance claims.

In the recent test group, four small SUVs earn the highest rating of superior, three are rated advanced, and one earns a basic rating.

IIHS first tested rear crash prevention systems in 2018 and has periodically added to the ratings since then.

Vehicles that only have parking sensors that issue warnings, rear cross-traffic alert or both earn a basic rating. For vehicles with rear automatic emergency braking (AEB), the rating is determined by how their systems perform in three tests using a passenger vehicle target with different approach angles and one test using a bollard representing a pole or garage pillar.

Tests with a pedestrian dummy are not included because the ultrasonic sensors used by most of today's rear AEB systems aren't designed to detect people — though they sometimes do.

The complete evaluation comprises 24 test runs conducted at 6 km/h, with some scenarios weighted more heavily than others. Systems are assigned points based on the number of runs that either avoid the target or reduce speeds to less than 2 km/h before hitting it.

Though the low-speed crashes that rear AEB addresses don't typically cause serious injuries, they can result in thousands of dollars in damage. Nearly 30% of collision claims in calendar year 2022 were for rear points of impact, and those claims had an average cost of over $4,000, HLDI data show. In contrast, rear AEB costs as little as $600 as an optional feature on some vehicles.

Rear crash prevention ratings: small SUVs

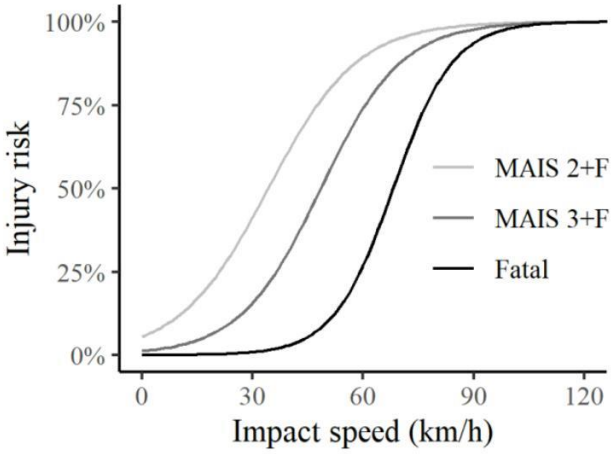
SUPERIOR	ADVANCED	BASIC
2023-24 Ford Escape	2023-24 Mazda CX-5	2023-24 Hyundai Tucson
2023-24 Honda CR-V	2023-24 Toyota RAV4	
2023-24 Mitsubishi Outlander	2023-24 Volkswagen Taos	
2023-24 Subaru Forester		

Vehicle height compounds dangers of speed for pedestrians

The faster a vehicle is moving when it strikes a pedestrian, the more likely it is to inflict serious injuries. Exactly how much more likely depends in part on the height of the vehicle, with taller vehicles compounding the risk from higher crash speeds, new research shows.

IIHS researchers analyzed pedestrian crashes to develop injury risk curves showing how speed affects crash outcomes. They found the effect of crash speed on injury risk was magnified for vehicles with taller front ends. Compared with risk curves developed using crash data from Europe, where tall passenger vehicles are less common, the U.S. risk curves show pedestrians begin to suffer more serious injuries at lower speeds.

Pedestrian injury risk by vehicle speed (U.S.)



The researchers examined 202 crashes involving pedestrians ages 16 or older. The records came from two databases — one of crashes that took place between 2015 and 2022 in Michigan and another of crashes that occurred in 2022 in California, New Jersey and Texas.

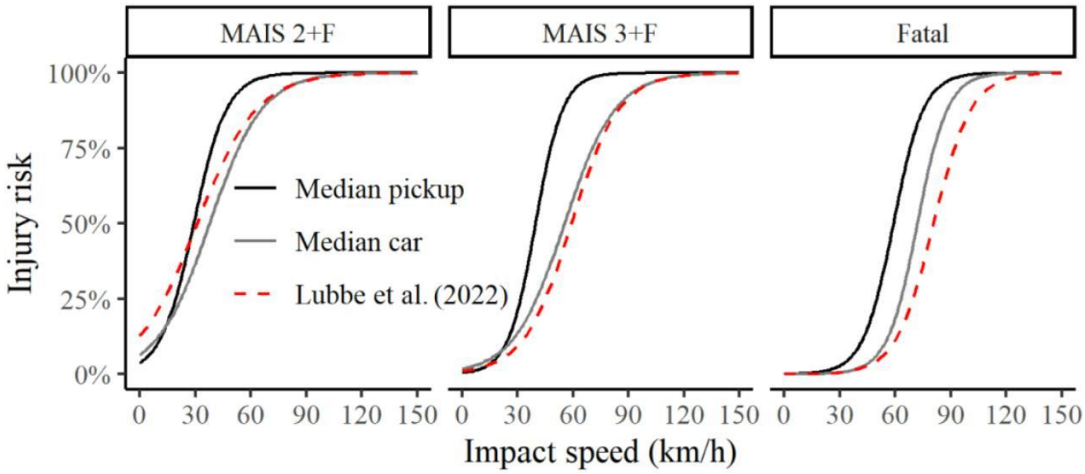
Photographs of the vehicle models involved were used to determine the height of the hood's front edge.

In general, higher vehicle front ends increased the likelihood of both moderate and serious pedestrian injuries. At 42.8 km/h, the average speed of all 202 crashes, a median-height car had a 60% chance of causing moderate or worse injuries (MAIS 2+F) to a pedestrian and a 30% chance of causing serious injuries or worse (MAIS 3+F). In comparison, a median-height pickup — with a front end 33 cm higher than that of a median car — had an 83% chance of causing moderate injuries and a 62% chance of causing serious injuries.

This tracks with earlier IIHS research that found that vehicles with taller front ends are more likely to kill people when they hit them.

The study's authors compared the risk curves they generated for the effect of speed with risk curves published in 2022 based on crashes in Germany. They found that pedestrians in the U.S. are more likely to be injured at all speeds. Hypothesizing that differences in vehicle size were to blame, they used the U.S. data to generate new curves for the median-height pickup and median-height car. The car curves are close to the German curves, while the pickup curves are shifted left, indicating increased risk at lower speeds.

Pedestrian injury risk for median U.S. pickup and median U.S. car vs. German vehicles



For serious injuries, the risk curve for the median pickup is not just shifted left, but is steeper as well. In other words, speed increases have a more pronounced effect when taller vehicles are involved.

For more information on any of these topics, visit https://www.iihs.org/news .

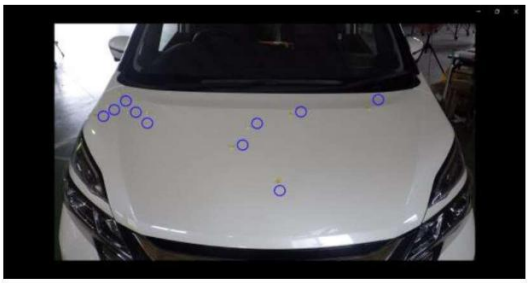
Provision of Technical Information on Paintless Dent Repair (PDR)

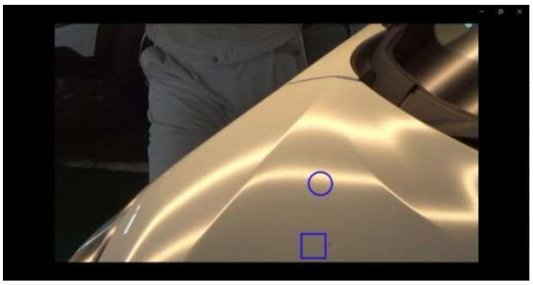
JKC routinely provides technical information to our partner insurance companies. Recently, hail damage has been increasing in Japan. Hail can simultaneously damage many vehicles, and while each individual dent is minor, the widespread damage poses challenges for both repairs and damage assessment.

Insurance companies have expressed concerns about the lack of basic information regarding repair methods and damage investigation. In particular, there is growing demand for Paintless Dent Repair (PDR), which, unlike traditional panel beating and painting, allows for quick repairs without the need for repainting. However, the adoption of PDR in Japan remains limited. Many insurance professionals lack knowledge about the PDR repair process, the specific tools required, and the techniques involved, leading to difficulties in negotiations with repair shops and in providing clear explanations to customers.

To address these challenges, we have compiled technical information on PDR, collaborated with specialized companies, and documented actual repair processes to create training videos. These videos, featuring audio explanations, cover topics such as damage inspection methods, the scope of repairs, and actual repair procedures. They are designed to be practical resources for use in damage assessments and repair explanations in the field.

We will continue to contribute to the development of the industry by providing information that reflects feedback from those working on the frontlines.





Asia Technical Seminar Held in Japan

JKC, along with fellow RCAR members CIRI and KART, have collaborated in various ways to share information. From December 18 to 20, 2024, the Technical Seminar was held at JKC. A similar seminar was hosted by CIRI last year, and this year, JKC invited the other two organizations, with technical experts from each presenting their respective research findings.

After each presentation, lively Q&A sessions were conducted, covering various topics related to the themes discussed. The seminar served as a meaningful platform for sharing expertise and strengthening collaboration among the organizations.

Looking ahead, we aim to further enhance technical collaboration with other RCAR members, contributing to the advancement of the automotive insurance industry.

Minor Damage Light Alloy Wheel Repair Research

KIDI / KART

With increasing use of alloy wheels in vehicles, the frequency of minor damage also rising. This necessitates clear and standardized repair guidelines to ensure both safety and cost-effectiveness. The current lack of standardized criteria leads to inconsistent repair practices and unnecessary repairments, causing economic losses and environmental concerns.

The average annual number of wheel claims has increased by 7% over the past three years, and average replacement ratio was about 76%. The total amount of wheel claims is approximately 46,758,620 USD, a 19% increase compared to the previous year. In particular, there is a significant difference in claim amounts between domestic and imported vehicles. As a result of AOS claim data analysis, the average claim amount for wheel repairs is 36 USD for domestic vehicles and 237 USD for imported vehicles, a difference of 6.55 times.

Category		2021	2022	2023	Average annual increase ratio
Number of wheel claims		463,639	487,543	531,434	**7%**
Wheel claim amount	Repair shops	965,517 USD	965,517 USD	1,241,379 USD	14%
	Parts distributer	32,344,828 USD	33,931,034 USD	45,517,241 USD	19%
	Total	33,310,345 USD	34,896,551 USD	46,758,620 USD	**19%**

The Ministry of Trade, Industry and Energy has revised the “Act on the Promotion and Conversion to Environment-Friendly Industrial Structure”. As a result, remanufacturing test standards (KS certification) for light alloy wheels, which are frequently damaged parts, are established. This test standard has enabled us to begin research into repair standards for light alloy wheels.

We set two core testing types: comparative analysis against OEM wheel and individual assessment against established Korean Industrial Standards.

- Comparative test: Comparing test results of OEM and repaired light alloy wheels to compare performance and quality
- Individual test: Checking whether the repaired light alloy wheels pass the remanufacturing KS standards.

No.	Wheel type	Test methodology	Remarks
1	Domestic car OEM wheel	Comparative test	Hyundai Grandeur(HG)
2	Domestic car repaired wheel		
3	Imported car OEM wheel		Benz CLS(C218)
4	Imported car repaired wheel		
5	Domestic car repaired wheel & Imported car repaired wheel	Individual test	Benz GLA, Hyundai Ioniq 6, Hyundai Santa Fe(DM)
6			Benz E, Hyundai Gradeur(GN7), Kia Sportage(NQ5)
7	High-priced imported car repaired wheel		Benz GLE, Licoln Aviator, Audi e-tron

Total of 21 light alloy wheels (6 OEM, 15 minorly damaged) were acquired and they underwent damage restoration process through wheel repair shops. Damage restoration of light alloy wheels was performed by methods such as cutting, sanding and painting. Welding and putty repair were not performed due to concerns about cracks in the repaired area.

<Test examples of damaged alloy wheel>

Car	Alloy wheel	Damaged area	Damage(mm)	
			Surface	Bend
Benz GLA			0.31	0.51
Hyundai Ioniq6			0.42	0.50

<Alloy wheel Repair Process>

1. Visual Inspection	2. Damage Check	3. Wheel Balance Check	4. Stripping
			
5. Sanding	**6. Cleaning**	**7. Painting (Base, Liquid)**	**8. Lathe Machining**
			
9. Heat treatment	**10. Painting (Clear, Powder)**	**11. Heat treatment**	**12. Post-Repair Quality Check**
			

After the repair, we conducted quality tests on light alloy wheels. Specifically, we checked whether there was a performance difference between repaired wheels and new OEM products, and whether they met the KS standards. The test results showed that there was no significant difference between the repaired wheels and the new products, and that all the repaired

wheels met the KS standards.

Remanufactured wheel KS test Standard

- **Dynamic Rotary Fatigue Test**: This test evaluates the axial fatigue durability of the wheel. It tests how well the wheel golds up against repeated stress in a rotating motion along its axis.
- **Dynamic Radial Fatigue Test**: This test assesses the rotational fatigue durability. It simulates the stress the wheel experiences while rotating and bearing weight, checking for weaknesses that could lead to cracking or air leaks
- **Bending Test**: This test measures the bending status of the alloy wheel. This test ensures the wheel maintains its structural integrity under bending stress, preventing excessive deformation
- **Impact Test**: This test verifies the wheel's impact resistance against shock loads. This simulate hitting a pothole or curb, ensuring the wheel can withstand sudden impacts.

According to this research, we created the alloy wheel minor damage repair standards (Table below). We are planning to include this in the "Automobile Insurance Standard Terms and Clause".

<table>
<tr><th colspan="2" rowspan="2">Category</th><th colspan="4">Damage type(draft)</th></tr>
<tr><th>Type1</th><th>Type2</th><th>Type3</th><th>Other types</th></tr>
<tr><td colspan="2">Damage type</td><td>Only the clear coat is peeled off</td><td>Both clear coat and the paint are peeled off(No material damage)</td><td>Scratches, dents etc., where the pain is damaged along with part of the wheel material.(Surface damage within 5mm, Curvature damage within 2.5mm)</td><td>Conditions with cracks, dents, bends, holes, etc.(Damage that cannot be restored with minor damage repair methods)</td></tr>
<tr><td colspan="2" rowspan="2">Repair standard</td><td colspan="2">Since it falls under minor damage, restoration repair is performed without replacing parts</td><td>Parts can be replaced with qulity-certified parts or remanufactured parts or restoration repair can be performed</td><td rowspan="2">Parts can be replaced</td></tr>
<tr><td colspan="3">※ However, depite minor damage, if bolt fastening areas are damaged, parts can be replaced</td></tr>
<tr><td rowspan="2">Repair method</td><td>Material restoration</td><td colspan="2">Not applicable</td><td>Damage restoration through lathe processing, sanding etc., or part replacement</td><td>Lathe processing, sanding, etc., to restore damage.(Replace parts if restoration is impossible)</td></tr>
<tr><td>Paint resoration</td><td>Polishing (Gloss work)</td><td colspan="3">Repainting (excluding powder coating)</td></tr>
</table>

Performance Evaluation of AEB Based on Real World Accidents

The Autonomous Emergency Braking (AEB) system detects objects in the front and rear areas of a vehicle, warns the driver, and intervenes by decelerating or automatically braking to directly prevent accidents. Initially, AEB systems were designed to detect only vehicles ahead, but with advancements in technology, their detection areas have expanded to include pedestrians, cyclists, and others. Recently, most advanced vehicles equipped with front-side radar can detect pedestrians crossing the road while the vehicle is making left or right turns.

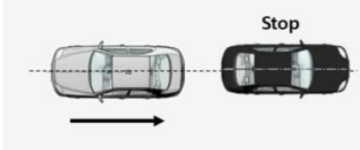
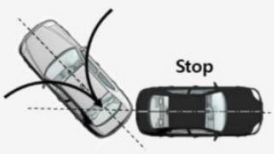
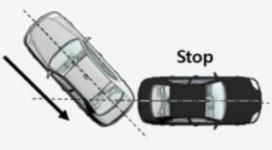
An analysis of automobile insurance statistics from 2021 to 2022 revealed that pedestrians accounted for approximately 50% of traffic fatalities. During the same period, an analysis of 123,021 pedestrian accidents reported to insurance companies showed that severe injuries and fatalities most frequently occurred during road crossings, followed by left/right turns, longitudinal movements, reversing, and other scenarios. This highlights that pedestrian accidents are particularly prevalent during crossings and vehicle left/right turns.

<Car to Pedestrian accident severity by accident type>

Category	Longitudinal	Crossing	Turning	Reversing	ETC	Total
Total cases	36,771	36,394	25,101	19,046	5,709	123,021
Percentage	29.9	29.6	20.4	15.5	4.6	100
Minor injuries	31,849	26,487	19,538	16,333	4,058	98,265
Percentage	32.4	27.0	19.9	16.6	4.1	100
Serious injuries	4,716	9,173	5,239	2,617	1,487	23,232
Percentage	20.3	39.5	22.6	11.3	6.4	100
Fatalities	206	734	324	96	164	1,524
Percentage	13.5	48.2	21.3	6.3	10.8	100

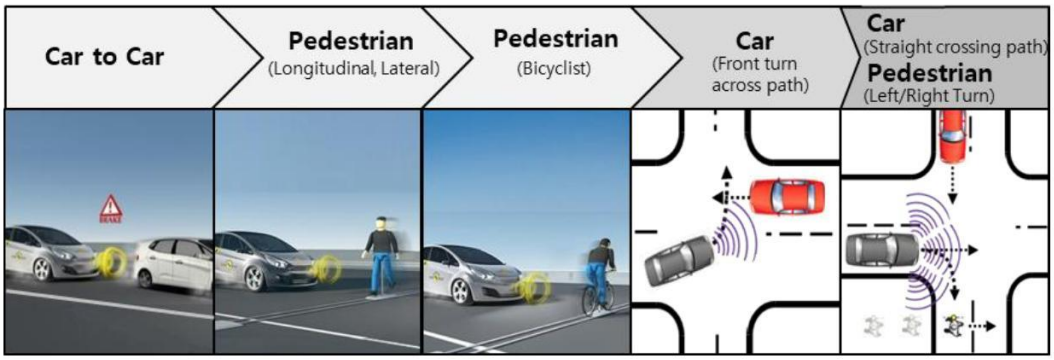
The Parking-AEB (P-AEB) system helps prevent crashes by automatically braking when a slow-moving car is about to hit something behind it. Initially, P-AEB systems could only detect objects in the rear, but latest vehicles can now detect objects in the front, rear, and side areas to prevent accidents. Rear-end collisions during parking constitute approximately 39% of all property damage claims. An analysis of 4,071 real accident videos revealed that reversing accidents are four times more frequent than forward-moving ones. In the analysis of 3,221 cases involving stationary vehicles, three main types accounted for 74.4%.

<Types of parking accident (Top 3)>

1st. Straight + Reverse (1,094 cases)	2nd. Steering + Oblique reverse (780 cases)	3rd : Straight + Oblique reverse (522 cases)
		

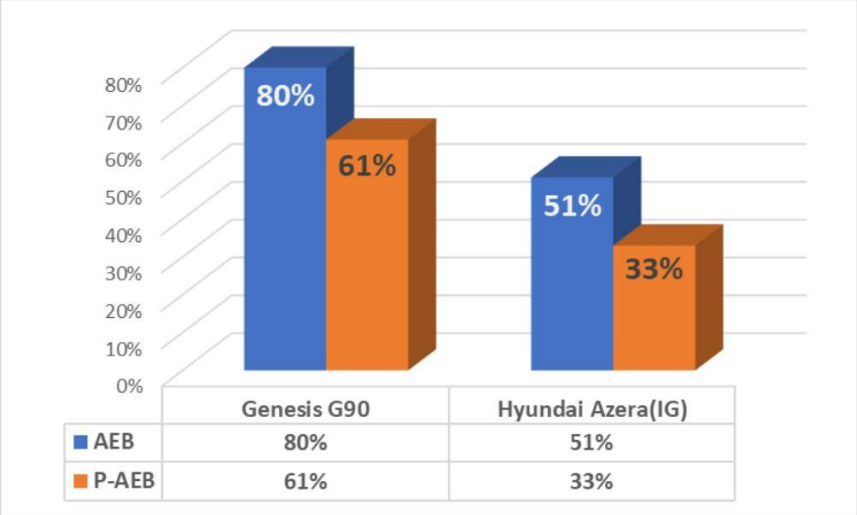
This study conducted performance evaluations on two vehicles according to Euro NCAP and RCAR standards for AEB and P-AEB systems. The Hyundai Azera (IG) has an AEB system that can stop crashes with people crossing the road when driving straight, but it cannot detect people crossing during left or right turns. The Genesis G90 has an AEB system that can detect pedestrians crossing the road when turning left or right. The Hyundai Azera (IG) is equipped with a P-AEB system that prevents collisions at the rear while parking. The Genesis G90 can also detect and prevent collisions at the front, rear, and sides.

<Evolution of AEB performance>



Out of 45 test scenarios, the Genesis G90, which can detect people when turning left or right, avoided accidents in 36 cases. The Hyundai Azera (IG) avoided accidents in 23 cases. In parking tests with 18 scenarios (6 for moving forward and 12 for reversing), the Genesis G90 avoided accidents in 11 cases (5 forward and 6 reversing), while the Hyundai Azera (IG) avoided accidents in 6 cases. These results show that cars with AEB, capable of detecting pedestrians crossing the road during left or right turns, can prevent more accidents than cars without them. Based on this, we shared the results with car manufacturers and suggested discussions to encourage the adoption of latest AEB systems with more extensive detection capabilities as standard features in new cars.

<AEB/P-AEB performance evaluation results>



< Attachment: Explanation Session on Vehicle Ratings in Thatcham and KART/KIDI>

■ Date and times: Dec. 5, 2024, 10AM ~ 3PM

■ Venue : Korea Insurance Development Institute

■ Presentation topics

(1) Status and Improvement of Group Rating, Revision of RCAR Structrual barrier (KART)

(2) History and Updates of the UK Vehicle Rating System (Thatcham)

■ Participants : Approximately 30 atendees, including domestic and international vehicle manufacturers, Financial Supervisory Service and insurance product managers from insurance companies

New Motor Liability Insurance Act in Finland

The reform of the Motor Liability Insurance Act is based on the national implementation of the EU Motor Insurance Directive. The new act entered into force in Finland on 1 June 2024. The aim of the reform is to ensure compensation for personal injuries in the event of a collision, regardless of the coverage of voluntary insurance or the personal wealth of the person who caused the accident.

The most important change in the reform of the Motor Liability Insurance Act is the inclusion of electric mobility devices in statutory insurance. According to the law, motor vehicles whose weight exceeds 25 kg or whose design speed exceeds 25 km/h must be insured. The 25/25 rule is simple because speed and weight can be found from the vehicle's product information.

The change affects a relatively small proportion of consumers, as e.g. electric skateboards sold on the market often fall below the insurance limits. In addition, the majority of electrically assisted bicycles are excluded from the insurance obligation. Instead, the insurance obligation applies to electric mopeds and electric equipment for transporting goods, such as delivery robots in retail stores.

Rental electric skatebords

There is one important point in the new law: all rental electric skateboards must be covered by motor liability insurance, regardless of their weight and speed. The operator is responsible for obtaining a motor insurance policy. In the event of an accident, only medical expenses will be compensated for the driver's own damages. Damage caused to third parties will be compensated in accordance with normal practice.

Finnish motor liability insurance is among the best in the world in terms of compensation level, as personal injuries are compensated without an upper limit. In only a few other countries are the personal injuries of the person who caused the accident covered by statutory motor liability insurance. Elsewhere, additional insurance must be purchased for it.

A new damage handling process description

The Finnish Motor Insurer’s Centre and The Finnish Central Organization for Motor Trades and Repairs have jointly prepared a damage repair process description, which contains information on good practices and operating methods in the industry. Its aim is to ensure a smooth and high-quality damage repair process and to improve the operational capabilities of the parties involved.

The description covers the essential aspects from the event of an accident until the vehicle is handed over to the customer after repair. It contains the rights, responsibilities and requirements of the parties in the whole damage handling process. The parties to the process are the customer, the body shop and the insurance company.

Damage Calculation

The instructions contain essential key points for damage assessment, the selection of the right repair methods and suitable spare parts. It also covers all the essential points to consider at the repair shop, such as damage handling and assessment, calculating repair costs, communication between the parties, preparing and carrying out the vehicle for repair, quality control etc. The guidelines also refer to modern training and skill requirements, meticulous and professional repair methods, quality control criteria for bodywork and painting, vehicle or material manufacturer´s repair instructions, motor vehicle maintenance and repair terms. There

are also several references to different regulations and legal requirements related to repair such as Motor Liability Insurance Act, Electrical Safety Act, Traffic and Personal Injury Board Guidelines etc. It is important to be aware of the more detailed content of these as part of the modern body repair process.

The sole purpose of the document is to describe a good damage repair process, increase knowledge and improve the operational capabilities of the various actors. It has no binding effect on the activities of the parties involved

Safety cab repair options

Every year, insurance companies in Finland cover several repairs to safety cabs on construction machinery due to various types of damage. The repair costs are often very expensive and time-consuming, especially if the cab has to be replaced due to damage.

The challenge in repairing damage to machinery has been the lack of repair instructions from the cab or construction machinery manufacturers, as a result of which damaged cabins that could be repaired have ended up being replaced. To ensure cost-effective repairs in the future, the Finnish Motor Insurers' Centre, together with the research and inspection institute Kiwa-Inspecta has mapped out the repair guidelines for safety cabs on construction machinery to reflect new material thicknesses and structures.

In order to expand and update the repair options to match stronger structural thicknesses, the technical requirements and materials used in the cab structures in the original study were investigated. Extensive basic research and suitable studies were carried out on the materials in use to determine their strength properties and to identify the repair processes required for the repair measures. Previous guidance covered material thicknesses up to 4 mm, but with the updated research, repairs can now be carried out on significantly thicker materials.

Excavator digging in forest

In future, it will be possible to repair damage to safety cabins, provided that the repairer has demonstrated his professional competence and the repairs are carried out under the supervision of an inspection body and only in approved repair shop and finally the quality of the work is inspected and approved by an authorized inspection body.

After the repair, the original structural properties remain unchanged and the structures meet the requirements set for it, such as ROPS, FOPS. The approved repair and inspection is always accompanied by a separate document verifying the professionalism of the repairs.

MRC Technical Research Projects 2025

We are excited to highlight some of the key technical research projects that our MRC Research team is currently working on. We are engaging with various agencies, organisations and universities for collaborative technical research projects such as ADAS Technology Effect on Claims Frequency Reduction, Malaysian Vehicle Theft Study 2025 and ASEAN NCAP Collaborative Holistic Research (ANCHOR 5) for Frontal and Side Impact Test Protocol Study.

Research Paper #1: ADAS Technology Effect to Claims Frequency Reduction

As the number of vehicles equipped with ADAS technology increases, the frequency of accident claims is expected to decrease. However, the cost of claims per vehicle is likely to rise. The main objective of this study is to substantiate the above hypothesis.

We are to define and classify the vehicle models equipped with ADAS technology in Malaysia, determine the number of ADAS-equipped vehicles involved in claims and analyse their frequency, and compare the claims cost of vehicles with ADAS against those without.

MRC Research team will be using claims data extracted from MRC Integrated Claims and Automotive Portal (iCAP) for the year 2024. The car parc data will be based on Malaysian Automotive Association (MAA) sales figure (Total Industry Volume) statistics from January 2023 to December 2023, which will be available in March 2025.

Research Paper #2: Malaysian Vehicle Theft Study 2025

MRC Research team is conducting a study on vehicle theft and the current trends in Malaysia to better understand the challenges in automotive security.

MRC Research team will collaborate with Insurance Services Malaysia (ISM) and the Vehicle Theft Reduction Council of Malaysia Berhad (VTREC) to conduct an in-depth study aimed at gathering valuable insights on vehicle theft trends and data. In addition, MRC Research will collaborate with the Modern Vehicle Expert Group (MOVE) and Cyber Security Malaysia (CSM) to explore the latest techniques and technologies employed by thieves in vehicle theft. The study will also investigate how these advancements are being adapted in repossession practices, focusing on the use of technology in recovering vehicles.

By highlighting our experience in vehicle security, MRC Malaysia aims to contribute to global efforts in improving automotive cybersecurity.

Research Paper #3: ANCHOR 5 Research Projects

The objective of ASEAN NCAP Collaborative Holistic Research (ANCHOR) is to establish scientific evidence on regional characteristics to guide the development of ASEAN NCAP roadmap. The research conducted under ANCHOR are based on road accident data, research observations, field tests, and public or customer acceptance. The scope of ANCHOR's research is focused on four key pillars, which are Adult Occupant Protection (AOP), Child Occupant Protection (COP), Safety Assist Technology, and Motorcyclist Safety.

After the successful collaboration in the ANCHOR II & III projects, MRC Research team continues its active participation in the ANCHOR 5 2024/2025 project, collaborating with Universiti Teknikal Malaysia Melaka (UTeM) and Universitas Nasional, Indonesia to evaluate the ASEAN NCAP Side Impact Test Critical Location (R-point) using post-accident statistical data analysis.

As a reference, the ASEAN NCAP side impact test location is determined relative to the driver's seating position, known as the R-Point. This testing method follows guidelines from UN Regulation 95, EuroNCAP, and other major global assessment agencies. The results of the side impact test, based on this R-Point positioning, may be used to further refine and improve the ASEAN NCAP side impact test protocol in the future.

Concurrent with the first ANCHOR 5 research on Side Impact analysis, MRC Research team will also undertake a second research collaboration with the same universities for ANCHOR 5 second study. This study focuses on the evaluation of the ASEAN NCAP Frontal Impact Test Critical Location, specifically analysing real-case overlap offset and weight distribution (location of occupants) by using post-accident statistical data.

As a reference, the ASEAN NCAP overlap offset for frontal impact test is the percentage of the vehicle width directly in line with the barrier face and also based on the seating position of the driver, with this approach adopted from UN Regulation 94, EuroNCAP, and other leading test agencies worldwide. These standardized locations are essential for ensuring consistency and accuracy in vehicle safety assessments.

The source of data for this ANCHOR 5 study are based on the extracted claims data from MRC iCAP, insurance company records, police reports and actual accident photos and images.

In conclusion, all these technical research projects are expected to be completed before the year end. We may share some of the progress and findings during RCAR Annual Conference 2025 in Milan, Italy.

Electrification Challenges

At Thatcham Research, our strategic focus centres around two areas of electrification; High Voltage (HV) battery diagnostics and HV battery sustainability, and the challenges they pose to the repair and insurance industries. Our research has led us to improvements in these areas and how those opportunities will most benefit insurers, repairers and consumers and ultimately support Battery Electric Vehicle (BEV) adoption.

HV Battery Diagnostics

Background

One of the most significant challenges is the diagnosis of HV batteries post-collision, especially with HV batteries being such a high-value component relative the cost of the vehicle. There is significant research focusing on the battery State of Health (SoH), understanding the charge level and range of a HV battery over time. However, we are concerned with the battery State of Repair, such as battery condition and repair options for the battery after it has been damaged or degraded.

Figure 1 – HV Battery Diagnostic Test

It is critical to the repair and diagnosis process that batteries are fully checked to ensure correct and safe identification of faults or damage. If misdiagnosed, batteries may be unnecessarily or incorrectly repaired or disposed of. Failure to identify faults could result in severe consequences. This project will address these challenges by gaining a comprehensive understanding of HV battery diagnostic capabilities.

Objectives

This project aims to strive for better diagnostic tool capabilities from Vehicle Manufacturers (VMs) and third-party manufacturers.

We are working with multiple stakeholders to better understand what is achievable in battery diagnostics and how this will influence the automotive industry for repair, salvage, insurers, fleet owners, and consumers.

Since this project runs concurrently with the HV battery sustainability project, we will be well-positioned to advise on the associated risks, issues, advantages, process improvements, methods, and tooling, with hopes that diagnostic test information will soon contribute to performing HV battery repairs.

Progress

This project started by initially landscaping various third-party HV battery diagnostic tools available on the market and comparing their capabilities with VM tools. By establishing a database of this information, the data either provided or omitted by these tools was then easily compared.

Various VM and third-party diagnostic tools available on site were then utilised, allowing us to validate this information with real-world data. This enabled us to further enhance the information on our database and serve as a suitable evidence case for ongoing discussions with VMs and third-party suppliers.

We have since held discussions with VMs and third-party suppliers, and plan to discuss the acquired data and their plans regarding HV battery diagnostics testing.

HV Battery Sustainability

Background

As the adoption of BEVs continues to grow in the UK, so does the need to ensure that batteries are handled sustainably throughout its lifecycle and remain longer in the economy to maximize its value. Currently, when a BEV's HV battery sustains minor damage, VMs often recommend replacing the entire battery pack, regardless of the internal modules and cell functionality.

This inclination of replacement over repair accelerates demand for new battery production and leads to unnecessary waste and increased carbon footprint. Prematurely disposing a HV battery results in a loss in residual value, as many of these packs could potentially be repaired and returned to service if properly assessed. This is a critical consideration, as an inevitable increase in damaged batteries is likely to become a more common scenario with the growing adoption of BEVs.

HV battery repair methods are currently not standardised among VMs, and the effects on the sustainability and the insurance industry are not well understood.

Figure 2 – HV Battery Minor Underbody Damage

Objectives

This project aims to assess and validate the current capabilities and readiness of VMs and repairers to repair and replace HV batteries, and understand whether systems are in place to return to circulation.

We aim to understand how effective these systems are in terms of cost and repair/replacement turnaround time.

This project also seeks to identify HV battery repair facilities in the UK as part of monitoring their repair capabilities.

We are driving efforts for battery repair options and raising awareness of realising the value in the battery when it is disposed of, often needlessly. This, in turn, helps reduce waste and environmental impact in the BEV industry and contributes to a more circular economy.

Progress

We started by comparing HV battery repair and replacement costs (vehicle vs. whole battery vs. battery casing), followed by collecting and analysing VM repair and replacement methods, if available.

We also identified the average processing time for HV battery casing repair vs. replacement, and explored the tools, technologies, and expertise required to perform these repairs. All of this information has been logged on a database which has served as a suitable evidence case for ongoing discussions with VMs.

We have collaborated with various VMs, insurers, independent repairers and network repairers to understand the extent of the issues related to HV battery repairs, and we continue to work with them to help develop solutions.

There have been developments to incorporate outputs of this project into Vehicle Risk Rating to more accurately compare BEV battery cost and repair.

Projects Summary

Working with our industry partners, we have identified UK market opportunities as the circular economy builds for BEVs. Though there are gaps, we continue to develop our risk rating systems to drive the correct changes in the VMs to ensure the HV battery systems are designed for repairability. We are also collaborating with third-party equipment suppliers by supporting research into new products and services that will help close these gaps. However, we anticipate that research into battery diagnostics and sustainability will continue; as quickly as we understand these technologies, disseminate the key information and train the industry, this rapidly evolving technology will advance. Significant changes in battery chemistry, such as Sodium-Ion and Solid-state batteries, are approaching. VMs are driving for cost and weight efficiency, in parallel to safety improvements. We foresee fundamental architecture changes, such as Cell to Chassis (CTC), being a reality in the medium term as VMs strive for profitable BEVs.

Obituary to Dr. Hartmuth Wolff

It is with deep regret that the colleagues at the Allianz Center for Technology announce the death of their former colleague and friend Dr. Hartmuth Wolff who passed away on December 2nd, 2024, after a serious illness. He was 75 years old.

Hartmuth Wolff worked at the AZT from 1975 until his retirement at the end of 2008. Most recently, he was Head of Vehicle Technology and Safety and Deputy Head of the AZT.

He made significant contributions to the AZT and also to RCAR, which continue to have an impact on car insurance in Germany and worldwide. He was involved in the development of the RCAR structural test and headed the RCAR working group that developed the RCAR bumper test.

Not only in the RCAR community was he very present and balanced the institutes' interests well as the WG's chairman, he also represented both AZT and the spirit of RCAR in international industry contacts by filling the chairman's role with diplomacy and his enormous technical expertise.

As an expert, he also made key contributions to the introduction of the electronic immobiliser in Germany in the 1990s. In view of the massive increase in theft rates at the time, this was an enormously important factor in loss prevention which proved to be very successful. Hartmuth Wolff committed himself to this topc until his retirement and continously kept contact with the industry to further develop the electronic immobiliser as well as the OEMs' support for the insurers' forensic processes.

He has participated in many RCAR conferences and organised the 2004 RCAR conference in Berlin together with Prof. Dieter Anselm and the AZT team. His last RCAR conference was in Paris in 2008. Hartmuth Wolff was a modest and very competent colleague with a high level of loyalty and a fine sense of humor whom we remember very fondly.

Carsten Reinkemeyer & Christoph Lauterwasser

Dr. Harmuth Wolff at the International RCAR Conference in Paris in 2008