



United Nations
Economic Commission for Africa

17 - 18 October 2023 / Addis Ababa, Ethiopia

IMPROVING VEHICLES TO IMPROVE LIFE

- ECA - The challenge of E-vehicles
- CITA - RAG Africa Conference



UN Regs and E-vehicles:
aligning the
requirements

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UNECE**

Secretary to GRVA

Agenda



1. Introduction
2. Specific performance requirements for EVs
3. Specific inspection requirements for EVs

Electric Vehicles

General considerations



Shift from vehicles employing ICE to alternatives powered by electrical energy

Decarbonizing transport
Air and noise pollution reduction

This comes with regulatory adaptations addressing e.g.



Range
Power



Safety



Cyber Security



Life cycle considerations



Inspection

Launch of EV related activities back in 2012

1998 Agreement



Proposed by



Purpose

To address:

- (1) Safety concerns
- (2) Environmental concerns

Associated with EVs



Creation of

EVS

EVE



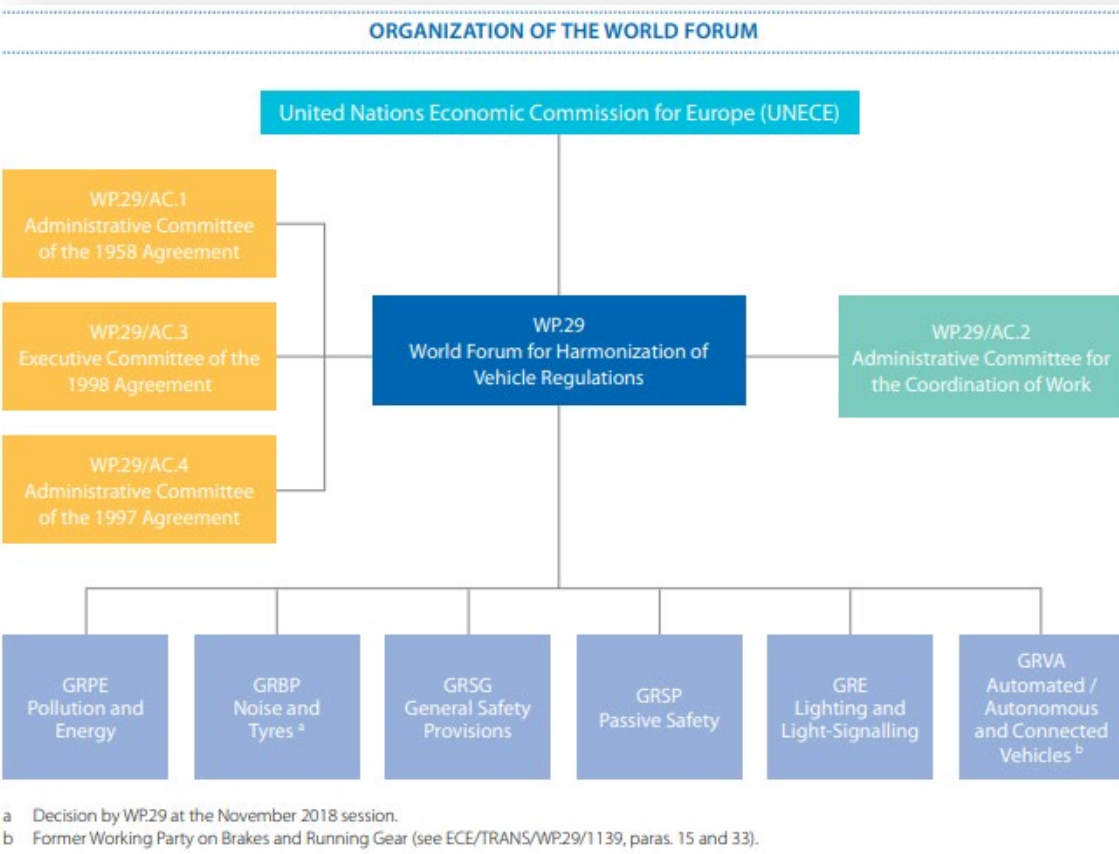
UNECE is:

- a United Nations agency
- part of the UN Secretariat
- One of the five regional economic commissions of the United Nations established under UN ECOSOC
- Custodian of 59 Conventions for inland transport
- UN ECOSOC gave UNECE a regional and an inter-regional mandate regarding transport



The World Forum WP.29

Structure and Framework



1998 Agreement:

- Adoption of UN GTRs
- No administrative provisions
- Suitable for the self certification and Type approval regimes

1958 Agreement for the

- Adoption of UN Regulations
- Mutual recognition of TAs

1997 Agreement for the

- Adoption of UN Rules
- Mutual recognition of PTI certifs.

The stakeholders



The UN Member States (Contracting Parties + Observers)



Manufacturers:



Suppliers:



Road and Public Transport Federations:



Technical services:



Motorists:



Consumer's representatives:



Standard Developing Organizations:



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Example of topics addressed

Safety, security, environmental performance



GRSP

EVS: UN GTR No. 20

Update of crash tests for EVs



GRPE

EVE: UN GTR No. 22
(Battery durability)

WLTP: UN GTR No. 15
(WLTP / EV range)

PMP: Particle emissions from brakes



GRBP

QRTV: Quiet Road Transport Vehicles and Approaching Vehicle Audible Systems (AVAS)



GRVA

CS/OTA: Cyber Security & Software Updates

EMB: Electro-mechanical braking



GRE

EMC: Electro-magnetic Compatibility

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Development of performance requirements for EVs

Example: UN GTR No. 20



- EVS Informal Working Group (IWG) to develop a GTR for EVs ensuring safety associated with
 - high voltage,**
 - electrical components** and
 - rechargeable electric energy storage systems (REESS).**
- IWG has more than 70 members ranging from CPs, industry standards-setting organizations and vehicle and battery manufacturers, research institutes and laboratories, academia
- Leadership: USA/Chair; EU&China/Co-Vice Chairs;
 Japan/Secretariat
- Phase 1: near-term critical safety requirements
- Phase 2: safety requirements that require long-term research as well as amendments to the UN GTR due to new information, data, etc.

Development of performance requirements for EVs

Example: UN GTR No. 20



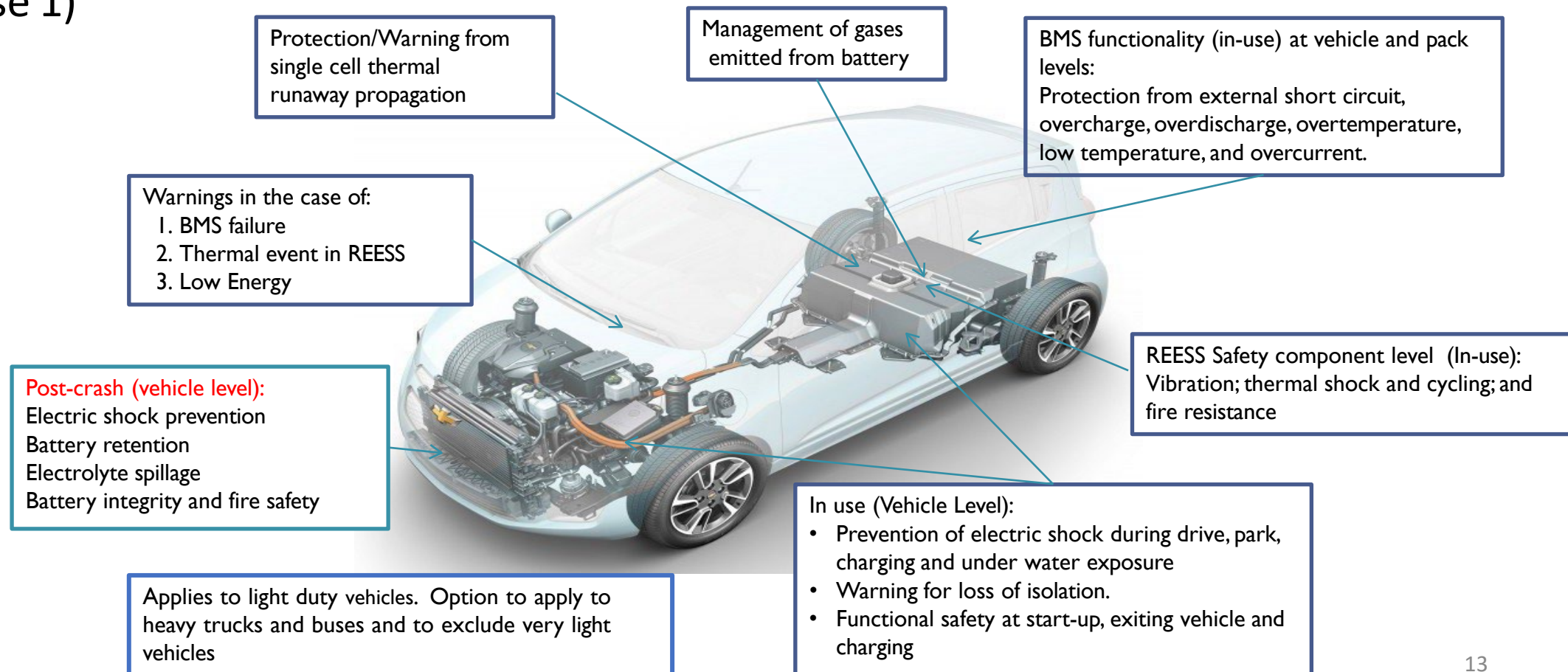
- GTR written in performance-oriented terms and science-based to address:
 - **In-use:**
 - Occupant protection: protection against electric shock, fire, explosion
 - Safety Performance for Li-Ion rechargeable electric energy storage system (REESS), BMS for over-charge, over-discharge, short circuit, extreme temperatures, vibration, fire resistance...
 - Safety requirements during charging
 - **During and Post-crash:**
 - Electrical isolation; protection against electric shock
 - REESS/Battery crashworthiness: integrity of the battery management system, robustness, survivability, physical battery retention

Development of performance requirements for EVs

Example: UN GTR No. 20



- The EVS GTR was established in 2018 as UN GTR 20 Safety Requirements (Phase 1)



Development of performance requirements for EVs

Example: UN GTR No. 20



- After the GTR was established, Phase 2 started in 2019 to:
 - Remaining items to consider:
 1. Test procedure for Thermal Propagation
 2. Test procedure for Vibration test
 3. Test procedure for Water immersion
 4. Flammability, toxicity, and corrosiveness of vented gases
- Estimated completion of the technical work by end of 2023

Example of topics addressed

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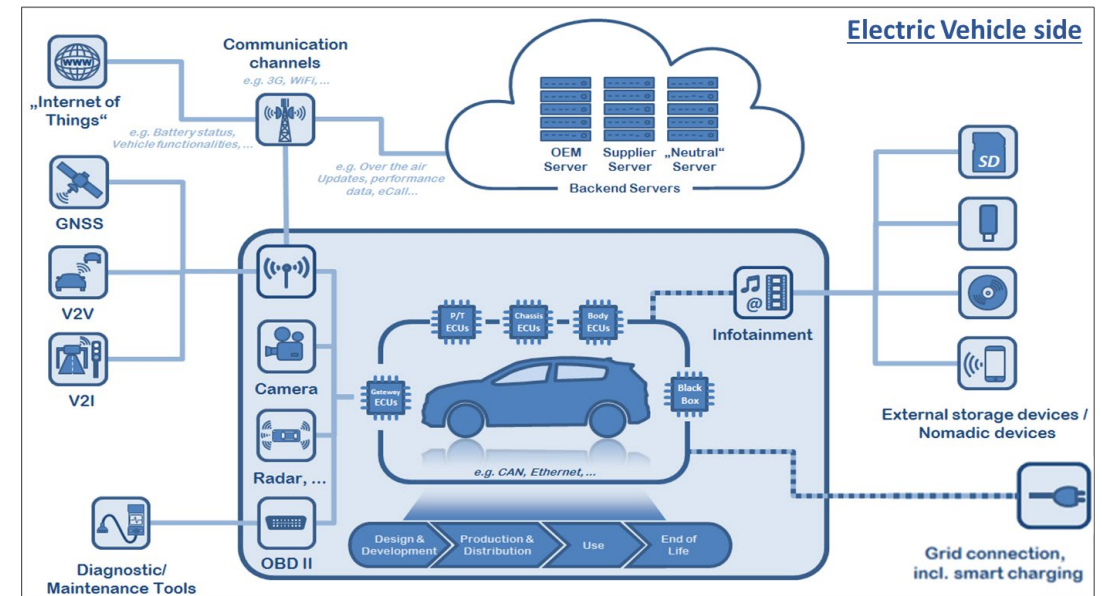
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Development of performance requirements for EVs

Example: Cyber Security



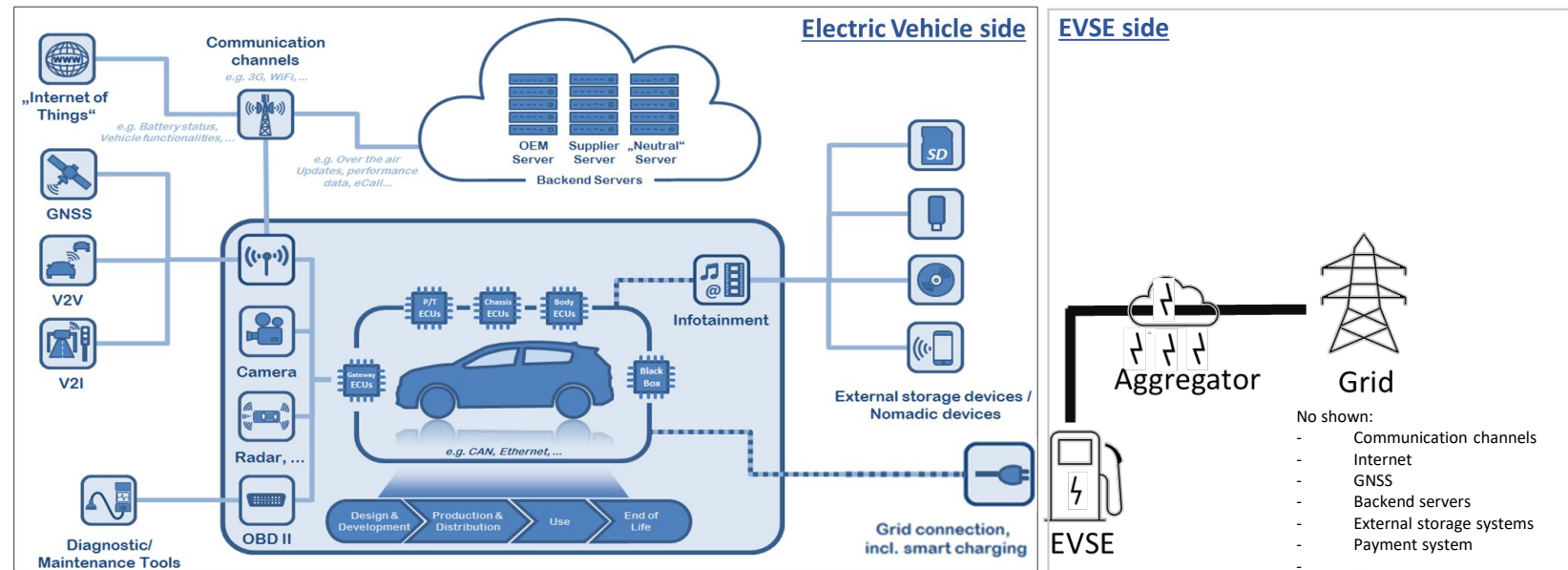
- WP.29/GRVA addressed cyber security:
 - Adoption of the guidelines on cyber security and software updates (suitable for both the '58A & '98A)
 - Adoption of UN R 155 ('58A)
 - Grid connection is in the scope



➔ The industry voluntary standards ISO/SAE 21343 and ISO/PAS 5112 support the implementation of these requirements

Development of performance requirements for EVs

Example: Cyber Security



The regulatory framework for EVs extended into a multidisciplinary exercise across different industry sectors

See: <https://unece.org/transport/inland-transport-committee/85th-itc-side-event-roundtable-electric-vehicle-charging>

Development of performance requirements for EVs

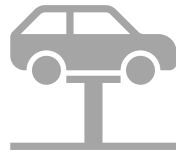
Example: Cyber Security



Management System

CSMS

Requirement for processes



Vehicle requirements

TARA

Verification that the product implements the organization processes

Tests are conducted to verify some mitigation measures



Monitoring

Manufacturer monitors attempted and successful attacks

Data collected to support forensics



Reporting

Each manufacturer reports to the Authority that issued the approval

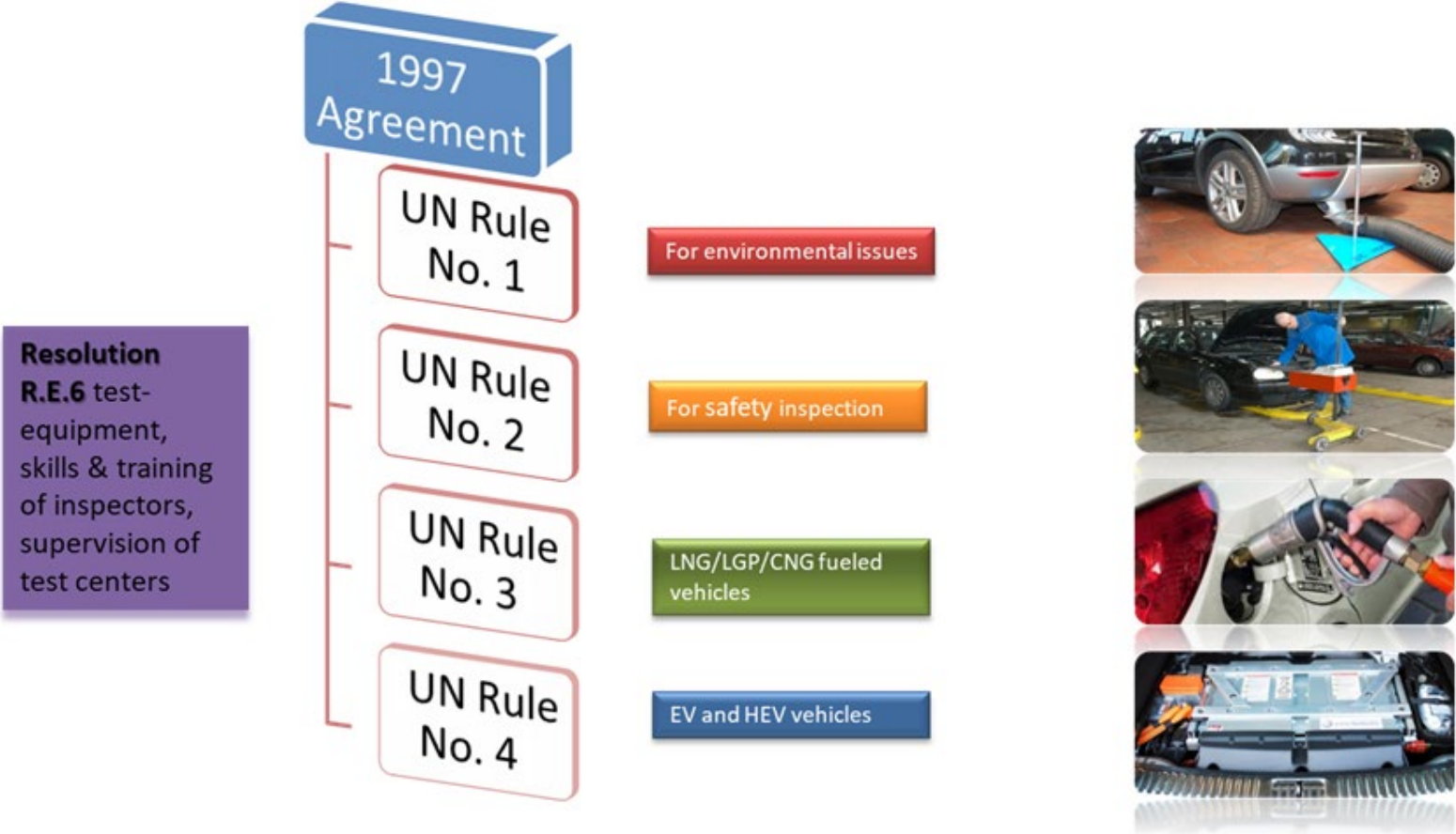
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The UNECE framework for vehicle inspection

1997 Agreement



1997 Agreement and its four UN Rules

The key elements



- Periodicity
- Test methods
- Deficiencies assessment criteria

7.2. Deficiencies that are found during periodic testings of vehicles shall be categorised in one of the following groups:

- "Minor deficiencies" having no significant effect on the safety of the vehicle or impact on the environment, and other minor non-compliances;
- "Major deficiencies" that may prejudice the safety of the vehicle or have an impact on the environment or put other road users at risk, or other more significant non-compliances;
- "Dangerous deficiencies", constituting a direct and immediate risk to road safety or having an impact on the environment which justifies that, a Member State or its competent authorities may prohibit the use of the vehicle on public roads.

3. Periodicity of technical inspections

Vehicle Categories	Maximum Inspection Intervals
Passenger-carrying motor vehicles: M ₁ , except taxis and ambulances	Four years after the first entry into service of the first registration and every two years thereafter
Goods vehicles: N ₁	
Passenger-carrying motor vehicles: M ₁ used as taxi or ambulances, M ₂ and M ₃	One year after the first entry into service of the first registration and annually thereafter-
Goods vehicles: N ₂ and N ₃	
Trailers: O ₃ and O ₄	

		Minor	Major	Dangerous
2.1.2. Steering gear casing attachment	With vehicle on a pit or hoist and the weight of the vehicle road wheels on the ground, rotate steering / handle bar wheel clockwise and anticlockwise or using a specially adapted wheel play detector. Visual inspection of the attachment of gear casing to chassis.	(a) Steering gear casing not properly attached. Attachments dangerously loose or relative movement to chassis/bodywork visible.	X	X
		(b) Elongated fixing holes in chassis. Attachments seriously affected.	X	X
		(c) Missing or fractured fixing bolts. Attachments seriously affected.	X	X
		(d) Steering gear casing fractured. Stability or attachment of casing affected.	X	X
2.1.3. Steering linkage condition	With the vehicle over a pit or on a hoist and with the road wheel on the ground, rock steering wheel clockwise and anticlockwise or using a specially adapted wheel play detector. Visual inspection of steering components for wear, fractures and security.	(a) Relative movement between components which should be fixed. Excessive movement or likely to unlink.	X	X
		(b) Excessive wear at joints. A very serious risk of unlinking.	X	X
		(c) Fractures or deformation of any component. Affecting function.	X	X
		(d) Absence of locking devices.	X	
		(e) Misalignment of components (e.g. Track rod or drag link).	X	
		(f) Unsafe modification ⁽³⁾ .	X	

Key specific elements for the inspection of EVs

UN Rule No. 4



Inspection frequency:

2 categories of defects:

- Minor defects,
- Major defects,
- Dangerous defects.

10+1 items for inspection: (in addition to those in UN Rule No 1)

<i>Vehicle categories</i>	<i>Maximum inspection intervals</i>
Passenger-carrying motor vehicles: M ₁ , except taxis and ambulances Goods vehicles: N ₁	Four years after the first entry into service of the first registration and every second two years thereafter
Passenger-carrying motor vehicles: M ₂ above 3,500 kg and M ₃ Goods vehicles: N ₂ and N ₃ :	One year after the first registration (or if the vehicle is not required to be registered, date of first use) and annually thereafter

Electric hazard marking	Electronic converters etc.
Electric regenerative braking system	Traction motor
Low voltage electrical wiring	Auxiliary power equipment (e.g. heater)
RESS (e.g. traction battery)	Service disconnect device
RESS management system, if fitted	“Active driving possible mode” indicator

+ Charging cables, if fitted, if required, if possible



INLAND TRANSPORT COMMITTEE



UNECE

Thank you!

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MSc., Dipl.-Ing.

UNECE

Secretary to the WP.29 Working Party on
Automated/Autonomous and Connected Vehicles “GRVA”

Secretary to the WP.29 IWG on Intelligent Transport Systems

Secretary to the WP.1 Group of Experts on drafting on a legal
instrument on the use of automated vehicles in traffic

Manifesto of the International Organization of Motor vehicle Manufacturers (OICA)

Following the initiative of the UNECE secretariat and UNSG Special Envoy Jean Todt:



Global Road Safety
OICA Manifesto
2019-10-28



1. OICA – The International Organisation of Motor Vehicle Manufacturers

The International Organisation of Motor Vehicle Manufacturers (OICA) is the world federation of 38 national auto industry associations, spread all over the world. Through these associations, OICA represents almost all vehicle manufacturers worldwide and is the officially accredited representative at the United Nations. OICA actively contributes to the activities of the UNECE World Forum on Harmonisation of Vehicle Regulations (WP.29) and its various working parties.

2. Road Safety – a global problem

Road traffic injuries continue to represent a major public health problem. As noted in UN Resolution 72/271 of 12 April 2018, more than 1.3 million people are killed, and 50 million people are injured in road crashes every year. 90% of these casualties occur in developing countries. Road traffic crashes are the leading cause of death around the world for children and young people between 15 and 29 years of age.

The huge majority of road traffic deaths and injuries are preventable and remain a major public health and development problem, with broad social and economic consequences.

3. An integrated approach to improve road safety in the most efficient way

The global motor vehicle industry, as represented through OICA, is strongly dedicated to the improvement of road safety worldwide.

Road safety is however a complex phenomenon, involving a combination of various factors and stakeholders, interacting with each other. These factors and stakeholders include road user training, education and behaviour, road and repair infrastructure, road traffic rules and their enforcement, efficient medical care system, progress in the analysis of accidents' causation and their consequences, vehicle fleet age and composition, vehicle design, etc. Isolating one of these factors, while neglecting the others, will not yield the hoped-for benefits: road safety calls for an "integrated approach", involving all stakeholders.

OICA strongly supports an integrated approach for road safety, involving all factors (road safety management, road infrastructure, road user behaviour, traffic rules' enforcement, safer vehicles...). Such integrated approach must not be contradicted by attempts to single out individual factors.

OICA recommends that the experience gained in developed countries, where such an integrated approach has resulted in unprecedented levels of road safety despite a high concentration of traffic, be put to good use in emerging countries.

OICA therefore also fully supports the recent UN Resolutions 70/260 and 72/271 on "Improving global road safety" as they address most of the parameters that need to be taken into account. More specifically, Resolution 72/271 also calls, in its Paragraph 10, for a holistic approach.

- The global motor vehicle industry, (...) OICA, is strongly dedicated to the improvement of road safety worldwide. (...)
- OICA called on all governments worldwide to place all actors in the auto industry on an equal competitive footing by setting compulsory minimum vehicle safety performance requirements for all new vehicles sold on their territory
- Direct responsibility of vehicle manufacturers rests with vehicle design and performance, and OICA therefore supports the necessity to lay down the necessary legislation in various regions
- OICA cautions against so called "cherry-picking", a practice where certain requirements are selected from different regulatory regimes. (...)

Short abstract

Subject	Requirement	Leadtime for implementation (in months after promulgation of the law)	Explanation
Brakes incl. ABS installation	R 13H.00 FMVSS 135 or other well-established requirements are to be considered as equivalent. In addition, installation of ABS, as specified e.g. in Annex 6 to UN R13H.00	36 Months	ABS installation is currently not mandated by UN R13H or FMVSS 135. The installation of ABS should therefore be a separate, additional requirement that the auto industry can fully accept.
ESC, including its installation	UN R 140.00, GTR 8, Supplement 7 to UN R13H. In addition, installation of ESC needs to an additional separate requirement. FMVSS 126 or other well-established requirements are to be considered as equivalent.	60 Months	ESC installation is, strictly speaking, currently not mandated by UN R140, even though the technical specifications are included. The installation of ESC should therefore be a separate, additional requirement that the auto industry can fully accept. FMVSS 126 however foresees mandatory installation Also Supplement 7 to UN R13H needs to be added as equivalent alternative since this originally contained the ESC specifications which are still valid.
Safety belt anchorages	Level of UN R14.05 for all seats, except for the centre rear seat, where 2 lower anchorage points should remain allowed (3 rd , upper point would remain optional). FMVSS 210 or other well-established requirements are to be considered as equivalent	24 Months	The main problem relates to the number of belt anchorages on the centre rear seat. Some vehicles produced locally in emerging markets still have only 2 anchorage points on the rear centre seat (compatible with a 2-point lap belt) and requiring 3 anchorages points would entail serious structural adaptation, and therefore longer time. There are also administrative issues, since official approval to UN R14.05 cannot be obtained anymore unless 3 anchorage points are installed. OICA therefore suggests for the time being that the legal requirements foresee <u>the level of UN R14.05</u> for all anchorages (e.g. based on a test report), while 2 anchorage points on the centre rear seat remain allowed for some more time. The complete switch to UN R14.05 (or equivalent or even higher versions) could occur at a somewhat later stage, to be reviewed locally.