



中国汽车技术研究中心有限公司

China Automotive Technology and Research Center Co., Ltd.

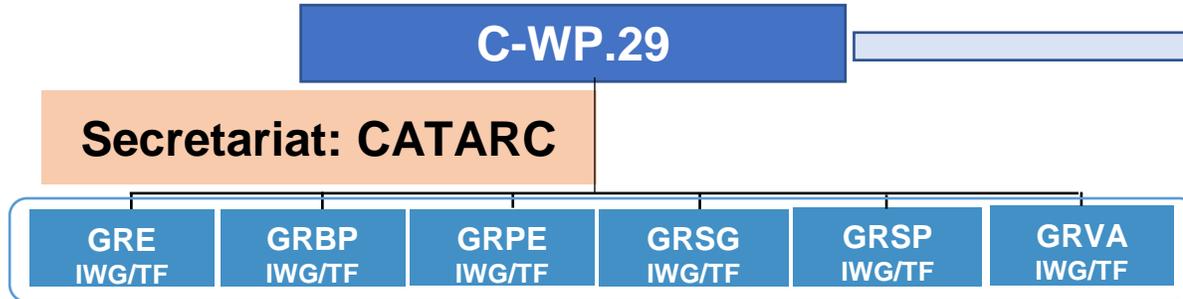
China's Participation into WP.29 Activities

CATARC

November 28, 2023

◆ C-WP.29 Mechanism

Open for communication and contribution



Technical Working Groups

Members

Technical personnel of standardization, test and R&D from **auto companies and research institutes**

Functions

- Follow UN/WP.29/GRs or IWG/TF working status and regulation development progress;
- Propose comments on technical issues;



- Make research on regulations and incorporate into Chinese standards
- Organize tests for relevant GTRs or UN regulations

Administrative Committee

Members

Government: Ministry of Industry and Information Technology(MIIT), Ministry of Transport, Ministry of Ecology and Environment, Standardization Administration of China(SAC)....

Non-Government: CATARC, CAAM, CRAES...

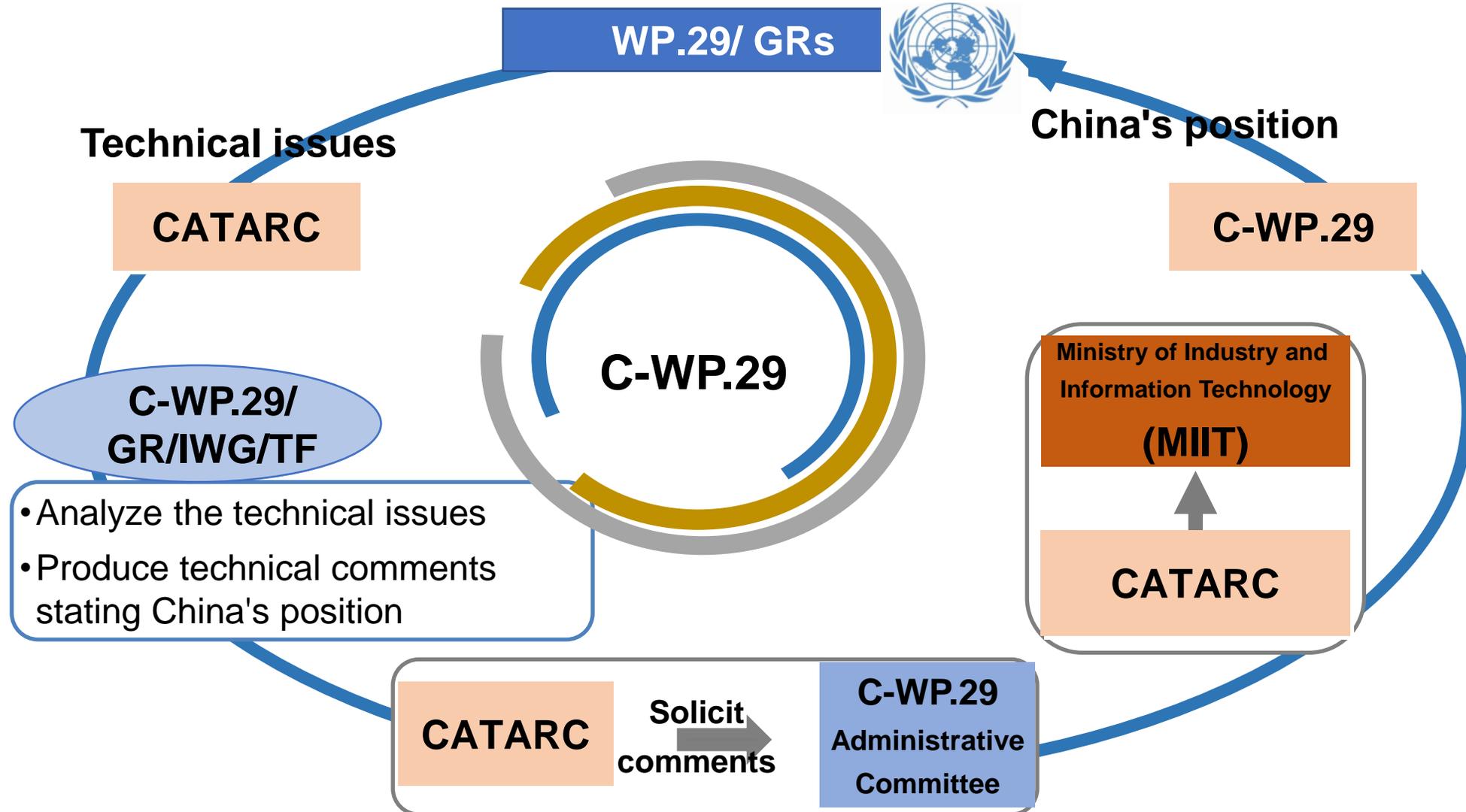
Functions

- with unified organization
- collaborate for solving cross-fields issues and bring out China's position



- Assist the government to join WP.29 sessions and perform obligation of 1998 Agreement Contracting Party
- Organize the work of six C-WP.29/GRs, such as to join WP.29 activities and make research.

◆ C-WP.29 working Procedure



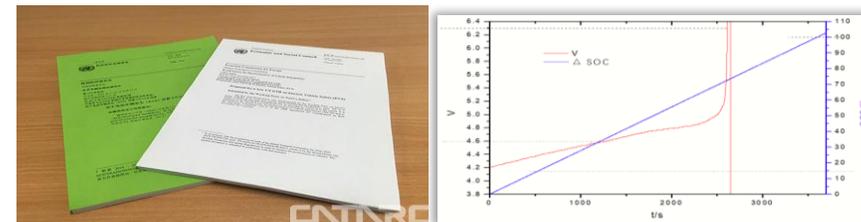
Participate in sessions

- Actively join in session of all levels covering WP.29, GR, IWG, TF etc.
- Follow the international regulations status
- Make contributions by putting forward technical proposals



Regulation development

- GTR: pay attention to all GTRs and share research data for regulation development
- Transpose published GTRs into Chinese standards.
- Take tests for sharing data for developing GTRs on EVE, EVS etc.



Content	DATA RETRIEVAL REQUIREMENTS	C-EDR																														
<p>1 Unified data retrieval connector GB/T 34589-2017 "Road Vehicles diagnostic connector"</p>	<p>Unified data retrieval protocol</p> <ul style="list-style-type: none"> ✓ Use diagnostic service 0x22 "ReadDataByIdentifier" in ISO 14229 "Road Vehicles unified diagnostic service" to retrieve EDR data. ✓ compatible with CAN bus and k-line. ✓ Compatible with functional addressing and physical addressing ✓ Compatible with 11-bit and 29-bit CANID 	<p>2</p>																														
<p>3 Unified data retrieval ID 0xFA13, 0xFA14 and 0xFA15 Where, 0xFA13 for the most recent event, 0xFA14 for the second event from the bottom, 0xFA15 for the third event from the bottom.</p>	<p>Unified data arrangement Unified data range, accuracy, resolution and data arrangement order</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Resolution</th> <th>Accuracy</th> <th>Resolution</th> <th>Accuracy</th> <th>Resolution</th> <th>Accuracy</th> <th>Resolution</th> <th>Accuracy</th> </tr> </thead> <tbody> <tr> <td>V</td> <td>V</td> <td>0.1</td> <td>±0.5%</td> <td>0.1</td> <td>±0.5%</td> <td>0.1</td> <td>±0.5%</td> <td>0.1</td> <td>±0.5%</td> </tr> <tr> <td>Δ SOC</td> <td>%</td> <td>0.1</td> <td>±0.5%</td> <td>0.1</td> <td>±0.5%</td> <td>0.1</td> <td>±0.5%</td> <td>0.1</td> <td>±0.5%</td> </tr> </tbody> </table>	Parameter	Unit	Resolution	Accuracy	Resolution	Accuracy	Resolution	Accuracy	Resolution	Accuracy	V	V	0.1	±0.5%	0.1	±0.5%	0.1	±0.5%	0.1	±0.5%	Δ SOC	%	0.1	±0.5%	0.1	±0.5%	0.1	±0.5%	0.1	±0.5%	<p>4</p>
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◆ Transposition of GTR into Chinese standard system

No.	Regulation No.	Name of Regulation	Adoption
1	UN GTR No.1	Door locks and door retention components	Yes
2	UN GTR No.2	Measurement procedure for two-wheeled motorcycles equipped with a positive or compression ignition engine with regard to the emission of gaseous pollutants, CO2 emissions and fuel consumption	Yes
3	UN GTR No.3	Motorcycle brake systems	Yes
4	UN GTR No.4	Test procedure for compression-ignition (C.I.) engines and positive-ignition (P.I.) engines fuelled with natural gas (NG) or liquefied petroleum gas (LPG) with regard to the emission of pollutants	Yes
5	UN GTR No.5	Technical requirements for on-board diagnostic systems (OBD) for road vehicles	Yes
6	UN GTR No.6	Safety glazing materials for motor vehicles and motor vehicle equipment	Yes
7	UN GTR No.7	Head restraints	Yes
8	UN GTR No.8	Electronic stability control systems	Yes
9	UN GTR No.9	Pedestrian safety	Yes
10	UN GTR No.10	Off-cycle emissions (OCE)	Yes
11	UN GTR No.11	Test procedure for compression-ignition engines to be installed in agricultural and forestry tractors and in non-road mobile machinery with regard to the emissions of pollutants by the engine	Yes

12	UN GTR No.12	Global technical regulation concerning the location, identification and operation of motorcycle controls, tell-tales and indicators	No
13	UN GTR No.13	Global Technical Regulation concerning the hydrogen and fuel cell	Yes
14	UN GTR No.14	Global technical regulation on pole side impact	Yes
15	UN GTR No.15	Worldwide harmonized Light vehicles Test Procedure	Yes
16	UN GTR No.16	Global Technical Regulation on Tyres	Yes
17	UN GTR No.17	Global technical regulation on the measurement procedure for two- or three-wheeled motor vehicles equipped with a combustion engine with regard to the crankcase and evaporative emissions	No
18	UN GTR No.18	Global technical regulation on the measurement procedure for two- or three-wheeled motor vehicles with regard to on-board diagnostics	No
19	UN GTR No.19	Global technical regulation on the EVAPorative emission test procedure for the Worldwide harmonized Light vehicle Test Procedure (WLTP EVAP)	No
20	UN GTR No.20	Global Technical Regulation on the Electric Vehicle Safety (EVS)	Yes
21	UN GTR No.21	United Nations Global Technical Regulation on the determination of system power of hybrid electric vehicles and of pure electric vehicles having more than one electric machine for propulsion - Determination of Electrified Vehicle Power (DEVP)	No
22	UN GTR No.22	United Nations Global Technical Regulation on In-vehicle BatteryDurability for Electrified Vehicles	No
23	UN GTR No.23	United Nations Global Technical Regulation on the measurement procedure for two- and three-wheeled vehicles equipped with a combustion engine with regard to durability of pollution-control devices	Yes
24	UN GTR No.24	Laboratory Measurement of Brake Emissions for Light-Duty Vehicles	No

◆ Proposed GTR drafts



GTR 21 (Determination of Electrified Vehicle Power)

proposal on determination method of mechanical transmission efficiency K2.

2. Issues for Discussion
Issue: #11.82 Determination for highly integrated Electric Drive System (EDS)

1) Possible Solution - Adapting GTR data

- A 1 to 1 better control ECU has been selected to conduct a comparison. 1) tested on testbed with external hardware. 2) CAN data applied.
- No car-to-car or discrepancy in efficiency. 95% is 0.44% assumed.
- Noted the accuracy of the CAN data to be required.

Subtest Data				
Current	Voltage	Motor speed	Torque	Efficiency (%)
407.0	256.4	6000	176.0	0.88

GTR Data				
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408.0	256.4	6000	176.0	0.88

2. Issues for Discussion
Issue: #11.82 Determination for highly integrated Electric Drive System (EDS)

2) Possible Solution - Adapting assembly efficiency instead

- A comparison of indicated power based on ECU from either assembly (motor inverter and speed reducer) or motor system (motor and inverter). 1.2% difference.
- Noted This approach is only valid for 10% when ECU is needed.

Result from 10% variable indicated power					
1 to 1 better control ECU	Max Battery Power (kW)	95	90	85	80-85
assembly	95	92.2	87.1	77.8	78.7
motor system	95	91	85.8	77.8	78.2



GTR 22 (In-vehicle Battery Durability for EV)

proposal on requirement of battery health accuracy.

SOCE Error

► The simplified test method of UBE_{measured}

$$UBE_{measured} = Q \cdot SOHC + \left(\frac{dSOC}{dt} \right)_{max} \cdot dSOC + \left(\frac{dSOC}{dt} \right)_{min} \cdot dSOC + I_{cell} \cdot R_{cell} + dSOC + dSOC$$

- Q: Certified Battery Capacity
- SOHC: State of Health - Capacity (affected by consistency and aging of battery)
- dSOC: State of Charge - High (affected by the increased resistance after battery aged)
- SOCL: final SOC when the UBE test ends (affected by the initial power performance and DCR increase of battery)
- dSOC: Change of SOC (affected by accuracy of SOC)
- $\left(\frac{dSOC}{dt} \right)_{max}$: DCV curve (the curve will shift after aging)
- I_{cell} : Current under WLTP at the beginning of life
- R_{cell} : Resistance under WLTP at the beginning of life (affected by the change of temperature and consistency of battery during the test procedure)
- SOCH: State of Charge - Resistance (the proportion of which the battery resistance increased)

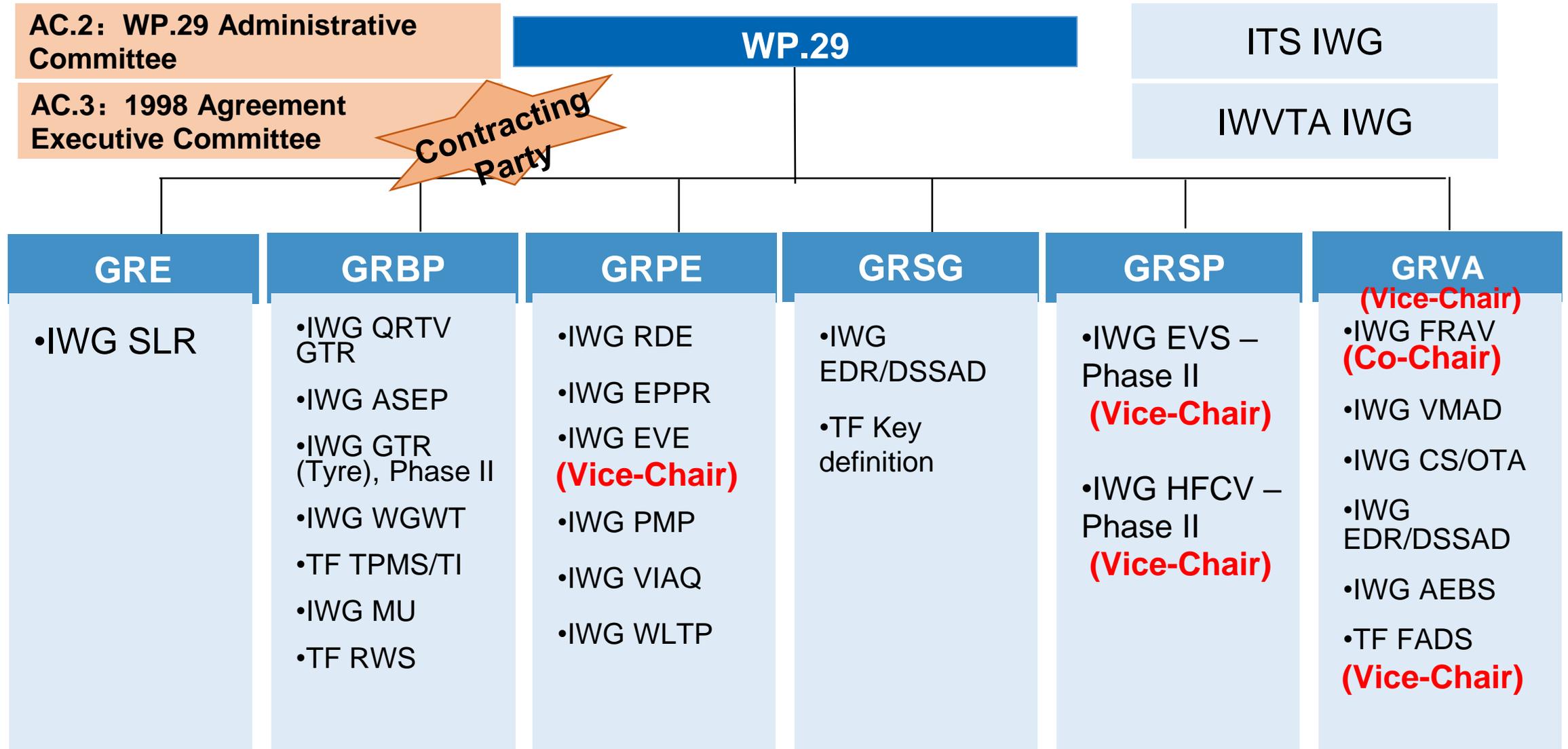
Calculation Error

- SOHC: Accuracy 3%-5%
- SOC: Accuracy 3%-5%
- Uocv: Accuracy ~1%
- R_{cell}: 10%
- SOHR: 5%-10%
- UBE_{measured} difference between certified and actual values
- **Estimated SOCE Error**
- SOCE > 3%

MPR-SOCE

- The most common approach in the industry is to measure SOH in terms of capacity. The expected SOHC of most batteries is 70% when they reach 8 years or 140,000km, which is different from the SOCE requirement. In general, SOCE is lower than SOHC.
- Since SOCE is calculated through data read, there is deviation between the data read and the actual value of battery energy. Considering all the possible errors, SOCE might not be able to reflect the most exact SOH of the battery.

◆ Taking the position of chairmanship



Contribution in 2022

GRPE

GB 14622-2016 Limits and measurement methods for emissions from motorcycles(CHINA IV) and GB 18176-2016 Limits and measurement methods for emissions of pollutants from mopeds(CHINA IV) has been listed into Compendium of Candidates for UN GTRs.

Contribution in 2023

IWG A-LCA

Take the vice-chair of SG3 and SG 5

IWG HFCV

Make contribution to Amendment 1 to GTR13 which has been adopted in June 2023

GRVA -TF FADS

Lead to make Report on the fitness of UN Regulations and UN Global Technical Regulations for their application to automated vehicles which has been adopted in June 2023

ITS IWG-TF VC

Take the vice-chair of TF VC

◆ CASIC (Geneva)

Under the joint promotion of the governments and industries of China and Switzerland, CATARC has initiated the establishment of the “China Automotive Standards Internationalization Center (Geneva)” in Geneva, Switzerland.



CASIC, as the first exploration of the Chinese automotive industry in the field of standard internationalization, has maximized the integration of industry resources, explored industry potential, and promoted continuous innovation in operational, organizational, and driving models, forming a new pattern of automobile standard internationalization guided by the government, led by central enterprises, participated by multiple parties with coordinated promotion.



CASIC
G E N E V A

With the principle of *Openness, Cooperation, Integration and Contribution*, CASIC (Geneva) is dedicated in liaison with and participation in harmonization of international standards and regulations in UN、ISO、IEC、ITU、WTO, to build a bridge for cooperation between international organizations, government agencies, and related industries, actively contribute Chinese wisdom to the development of international automotive standards and regulations, and promote the globalization and sustainable development of the domestic and foreign automotive industry through the internationalization of automotive standards and regulations.



中汽中心



中国一汽
FAW



东风汽车
DONGFENG MOTOR



长安汽车
CHANGAN



GWM



CHERY



WULING MOTORS



NIO



HUAWEI



SAIC



FOTON
福田汽车

◆ Summary

- Our national auto mandatory standard system was originally established and improved by referring to ECE Regulations (i.e. UN regulations) and GTRs.
- Due to different national conditions and auto industrial development status, different Contracting Parties have different understanding of regulations and needs for joining WP.29 activities. China is willing to actively participate in those activities for achieving real international harmonization.
- China has developed meaningful cooperation with major participants on Automated Driving, EV and A-LCA etc. And we wish to continue similar cooperation in more areas and in deep manner.



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