

---

---

# THE AUTOMOBILE AND TECHNICAL REGULATIONS

---

---

## 1 Introduction

This article presents recent trends in automotive regulations particularly those involving the planning, design, and development of vehicles, in conjunction with shifts in social conditions and government policies.

## 2 Overall Trends

### 2.1. Safety

#### (2) Active Safety

In the 2000s, active and preventive approaches to prevent accidents are becoming important, in addition to reducing damage in the event of an accident. Along with the market introduction of preventive safety technologies such as electronic stability control (ESC) and advanced emergency brake system (AEBS), standards have been established to specify their installation and performance.

#### (3) Automated Driving

The sensors and actuators developed for active safety, along with advances in the computerization and digitalization of vehicles, significantly advanced the possibility of achieving automated driving. Automated driving is categorized from level 1, which corresponds to driving assistance, to level 5, which is fully automated, depending on the degree of driver involvement. Since the conventional automobile structure law and the road traffic law are based on the premise that the driver will always operate the vehicle, various countries are promoting the development of laws that assume automated driving.

#### (5) Cybersecurity and Software Updates

Technologies that control the vehicle and update installed software over a network will make the commercialization of automated vehicles possible. This is achieved by a wireless data transmission technology known as over the air (OTA). However, the very presence of a communication device makes cybersecurity measures and the software updating process critical. Consequently, a management system certification that

inspects the management system of the manufacturer has been added to regulations covering this field.

### 2.2. Emissions, Fuel consumption (CO<sub>2</sub>), Noise (1) Emissions Regulations

Environmental standards governing pollutants harmful to human health have been established, and the governments of various countries have adopted emissions regulations for the sources of those pollutants.

Automotive emissions regulations have spread to various countries and been strengthened since they were first established by the U.S. State of California in 1960. The level of regulation and timing of adoption varies according to circumstances in the individual countries.

Regulated pollutants typically consist of hydrocarbons, nitrogen oxides, and carbon monoxide, which are precursors of the ozone causing photochemical smog, and of particulate matter and other substances that contribute to respiratory diseases.

Emissions are also subject to evaluation, starting with gas emissions from the exhaust pipe (tail pipe emissions), evaporative emissions from the fuel system (evaporative emissions), gas emissions during refueling (refueling emissions), and in-vehicle fault diagnosis systems (on-board diagnostics (OBD) regulations have also been expanded.

The evaluation test method for tailpipe emissions also started with a basic driving cycle test under standard conditions in various countries, followed by the addition of low-temperature/high-altitude conditions evaluation, the addition of off-cycle driving tests, and the Worldwide Harmonized Light Vehicle Test Cycle (WLTC), which was harmonized with UN standards, and developed into the real driving emissions (RDE) regulation, which obliges manufacturers to conduct actual on-road exhaust gas tests using exhaust gas inspection equipment that can be mounted on vehicles.

## **(2) Fuel Economy and Greenhouse Gas Regulations**

In the wake of the first oil shock in the 1970s, the U.S. established corporate average fuel economy (CAFE) regulations for passenger cars and light-duty trucks in 1978. They assign fuel economy standards by vehicle and size, and required the weighted average fuel economy of new vehicles to meet the regulatory values.

Since the 1990s, global warming has become a global social problem, and automobile fuel consumption regulations and CO<sub>2</sub> emission regulations have been introduced in various countries, starting with Japan and Europe, as one of the countermeasures against CO<sub>2</sub>, which is a greenhouse gas. In addition, emerging nations also started introducing fuel economy regulations after 2010, and 90% of the global market is currently subject to such regulations. Since the amount of CO<sub>2</sub> emissions is proportional to the amount of fuel used, CO<sub>2</sub> emission regulations have the same meaning as fuel consumption regulations, and the mainstream of regulations is also the CAFE regulation.

### **(3) ZEV Regulations**

In the U.S., in addition to regulations on emissions and on fuel economy and greenhouse gases, the state of California also has zero emission vehicle (ZEV) regulations. Those regulations make it mandatory for manufacturers with a certain volume of sales in California to sell a specified proportion of ZEVs.

If the number of ZEVs sold exceeds a certain percentage, credits can be obtained. If the number is below the certain percentage, that manufacturer has to purchase the credit shortfall from other manufacturers who have surplus credit. If the shortfall cannot be made up within the time limit, a fine will also be imposed.

### **(4) Noise Regulations**

In 1988, UN WP29 enacted UN-R51/01 to harmonize standards for noise test methods.

However, changes in contemporary driving patterns, vehicle performance, and usage no longer matching those at the time the regulation was established were cited as one reason lack of progress in reducing road traffic noise, and discussions to amend UN R51 began in 1996. The UN R51.02 Annex 10 (new acceleration noise test method) was then issued in 2007, and followed by the current UN R51.03.

## **2.3. Substances of Environmental Concern and Recycling**

### **(1) Vehicle Regulations**

Harmful substances released from abandoned or dismantled vehicles and the issue of resource recycling led to concerns about the burden on the environment. Against this background, the End-of-Life Vehicles (ELV) Directive was enacted in Europe in 2000, stipulating requirements for certification of recyclability rates, as well as obligatory marking of material indications for resins and rubbers. In addition, banning the use of four types of environmentally hazardous substances (lead, mercury, cadmium, and hexavalent chromium) was stipulated. Although there were some exemptions due to lack of alternative technology, their use was banned in line with technological developments, and the timing of the start of implementing restrictions on lead-acid batteries is currently being debated.

Outside of Europe, Turkey, Israel, Korea, China and India have also established ELV regulations. Among those, China has added brominated flame retardant to the above mentioned four prohibited substances, and is currently considering the further addition of polycyclic aromatic hydrocarbons (PAH) and asbestos. In Japan and Taiwan, the automotive industry is voluntarily reducing the use of substances of concern.

### **(2) General Chemical Substances Regulations**

Chemicals regulations in each country mainly covered only new chemicals, however, the European Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) have put a regulatory net on all chemicals, including existing chemicals. Of these, 211 substances have already been listed as candidates for substances of very high concern, and ethanol contained in windshield washer fluid and phthalate ester used as plasticizers have already been regulated.

## **3 United Nations**

### **3.1. International Harmonization of Automotive Technical Standards by the United Nations**

The United Nations World Forum for Harmonization of Vehicle Regulations (WP.29) discusses the international harmonization of automotive technical standards based on the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts (1958

Agreement) and the 1998 Agreement on UN Global Technical Regulations (1998 Agreement).

The 1958 Agreement, which was ratified by 53 countries and the EU, aims to establish uniform standards for the safety and environment of automobile structures and equipment (UN Regulations) and to mutually recognize UN-R approvals, and 164 UN-Rs have been enacted by September 2021.

The 1998 Agreement aims to harmonize global technical standards, and has been ratified by the EU and 37 countries. There are 21 established Global Technical Regulations (GTRs) as of June 2021. The GTRs are enforced through the integration of their technical standards in the domestic regulations of each of the contracting parties. While they offer hope for the promotion of international standards harmonization, there are also issues such as contracting parties incurring no obligation whatsoever for the applicable GTR if they abstain from voting when it is established, and the fact that countries are only required to make an effort to incorporate the GTRs into their domestic legislation.

### 3. 2. Outline of WP.29

WP.29 is a forum for global harmonization of standards. There are six specialized working parties under this forum: Working Party on Automated/Autonomous and Connected Vehicles (GRVA), Working Party on Pollution and Energy (GRPE), Working Party on Passive Safety (GRSP), Working Party on Noise and Tyres (GRBP), Working Party on General Safety Provisions (GRSG) and Working Party on Lighting and Light-Signaling (GRE).

To establish new regulations or make large-scale amendments, informal groups are organized under the working parties. Countries and organizations with an interest in the applicable case then gather to make a proposal following extensive specialized discussions.

On October 28, 2021, WP.29, together with WHO and others, announced the “Decade of Action for Road Safety 2021-2030” to achieve the goal of halving traffic casualties by 2030. Recommended actions for this purpose are promotion of multimodal transportation, improvement of transportation infrastructure, strengthening of vehicle safety regulations, improvement of behavior of road users, and improvement of rescue of accident victims.

### 3. 3. UN-R and GTR development status after 2021

Table 1 lists the new UN-Rs (including those scheduled

for November 2021) and series revisions (revisions with enhanced requirements) of the existing UN-Rs that came into effect from January 2021 onwards. Table 2 shows the new GTR and the revision of the existing GTR. In terms of safety, a new UN-R was enacted for multiple driver assistance technologies, cyber security and software updates. In relation to the environment, a new UN-R for Worldwide harmonized light vehicles Test Procedure (WLTP) was enacted.

## 4 Japan

### 4. 1. General Trends

Table 3 shows the types of automotive legislation (laws and orders) in Japan.

Compliance with the safety regulations, as well as the notifications and directives defining their details must be certified by the Ministry of Land, Infrastructure Transport and Tourism (MLIT) and mass production vehicles are primarily certified through a type approval system (“type designation” in the rest of this article). Japan has adopted over 90 UN regulations in its domestic standards, and allows mutual recognition of type approval with other countries that have signed the 1958 Agreement.

The high pressure gas containers and attendant accessories used in fuel cell, LPG, and CNG vehicles are subject to the High Pressure Gas Safety Act under the jurisdiction of the Ministry of Economy, Trade and Industry (METI), and require approval separate from the type designation.

### 4. 2. Vehicle Safety

#### (1) Progress of Safety Measures

Based on the 11th Fundamental Traffic Safety Program (FY 2021-FY 2025) formulated in March 2021, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) compiled a report entitled *The Future of Vehicle Safety for a Traffic Accident-Free Society* in June 2021. The MLTI aims to achieve its new target for 2030 (reducing 1,200 traffic accident fatalities compared to 2020) through following vehicle safety measures (1) to (4): (1) Ensure the safety of pedestrians, bicyclists, and other users (2) Ensure the safety of vehicle occupants, (3) Prevent certain types of serious accidents in light of social background (4) Promote the effective and appropriate use of AD-related technologies.

**Table 1** New and Revised UN-Rs that Came into Force since 2021

Number*	Name of regulation	Date of issue	Committee
0/03	IWVTA	2021.6.10	WP29
17/10	Strength of Seats, Anchorages, and Head Restraints	2021.6.9	GRSP
22/06	Helmets and Visors	2021.1.3	GRSP
35/01	Arrangement of Foot Controls	2021.6.9	GRSG
41/05	Noise(Motorcycles)	2021.9.30	GRBP
49/07	Emissions of diesel, LPG and CNG engines	2022.1.7	GRBP
78/05	Motorcycle and Moped Braking (L Category Vehicles)	2021.1.3	GRVA
79/04	Steering devices	2022.1.7	GRVA
94/04	Occupant Protection in Frontal Collisions (Frontal Offset Oblique Impacts)	2021.6.9	GRSP
95/04	Occupant Protection in Lateral Collisions	2021.1.3	GRSP
95/05	Occupant Protection in Lateral Collisions	2021.6.9	GRSP
100/03	Construction and Safety of Electric Powertrains	2021.6.9	GRSP
107/09	M2 and M3 vehicle structures	2021.9.30	GRSG
118/04	Bus fittings flame resistance	2021.9.30	GRSG
134/01	Hydrogen fuel vehicle	2022.1.7	GRSP
137/02	Restraint System in Frontal Impact (Full-Lap Frontal Impact)	2021.6.9	GRSP
141/01	Tire pressure monitoring system (TPMS)	2021.9.30	GRBP
142/01	Installation of tires	2021.9.30	GRBP
152/02	Advanced emergency braking system (AEBS) for M1 and N1 vehicles	2021.9.30	GRVA
153/00	Integrity of fuel system and safety of electric powertrain during rear-end collisions	2021.1.22	GRSP
154/00	Light Vehicle Emissions Type Approval Test Procedure (WLTP)	2021.1.22	GRPE
154/01	Light Vehicle Emissions Type Approval Test Procedure (WLTP)	2021.8.5	GRPE
155/00	Cyber Security and Cyber Security Management	2021.1.22	GRVA
156/00	Software Update Processes and Management Systems	2021.1.22	GRVA
157/00	Automated Lane-Keeping Systems (ALKS)	2021.1.22	GRVA
158/00	Vehicle rear monitoring devices when reversing	2021.6.10	GRSG
159/00	UN Regulation on Moving-Off Information Systems (MOIS)	2021.6.10	GRSG
R160/00	Event data recorders (EDR)	2021.9.30	GRSG
R161/00	Anti-tampering devices	2021.9.30	GRSG
R162/00	Immobilizers	2021.9.30	GRSG
R163/00	Vehicle alert systems (VAS)	2021.9.30	GRSG

\*: The number after the slash indicates the series of the amendment, and /00 is a new UN regulation.

**Table 2** New and Revised GTR that Came into Force since 2021

Number	Name of regulation	Date of issue	Committee
GTR No. 4, Amendment 4	Worldwide harmonized heavy duty certification (WHDC)	2021/6/22	GRPE

## (2) Strengthening of Safety Regulations and Harmonization of Criteria

The MLIT is working to incorporate newly established UN regulations in Japanese standards. In 2021, new UN-Rs such as UN-R158 (Devices for means of rear visibility or detection) and UN-R160 (Event Data Recorder (EDR)) were introduced into the Japanese domestic standards.

## (3) Automated Driving

In May 2019, the Road Transport Vehicle Act was amended to add automated driving systems to the devices covered by the safety regulations. The amendment

stipulates that automated driving systems must be equipped with an operating state recorder to monitor that state, and vested the authority to determine the driving conditions under which such systems are used in the Minister. The revised *Road Trucking Vehicle Act* was enforced in April 2020 ahead of the rest of the world.

## 4.3. Environmental Issues

### (1) Emissions

In August 2021, UN-R154 World harmonized Light vehicle Test Procedure (WLTP) was established as a domestic standard to harmonize the standards with UN-R. In addition, the RDE regulation is supposed to be applied to new models from October 2022 and to existing vehicles from October 2024.

**Table 3** Types of Automotive Legislation in Japan

Type	Established	Example	Remarks
Law	National Diet	Road Transport Vehicle Act Air Pollution Control Act High Pressure Gas Safety Act, and so on	Published in the Official Gazette Established upon National Diet approval, with the highest precedence after the Constitution
Cabinet Order	Cabinet Office	Order for the Enforcement of the Road Transport Vehicle Act Order for the Enforcement of the Air Pollution Control Act, and so on	Published in the Official Gazette Orders established by the Cabinet Office to implement the constitution or a law.
Ministerial ordinance	Minister	Safety Regulations for Road Vehicles, and so on	Published in the Official Gazette Order issues by Ministers of the various Ministries concerning the administrative procedures under their charge
Ministerial announcement	Minister	Announcement that prescribes details of safety regulations for road vehicles Permissible limit for automobile exhaust emissions Permissible limit of automobile noise	Published in the Official Gazette Format used by national or local public organizations to indicate the detailed content of ordinances or conditions
Circular	Director-General Deputy Commissioner Director	Test methods Inspection criteria, and so on.	Format used by government offices to inform the various authorities and employees of instructions, legal interpretations, or guidelines

In August 2020, according to the 14th policy report on *Future Policy for Vehicle Emission Reduction* of the Central Environment Council of Japan, in addition to the conventional regulation based on the mass of particulate matter, Japan has decided to introduce regulation based on the number of particles (PN regulation:  $6 \times 10^{11}$  pieces/km) and to start applying this regulation by the end of 2024 for gasoline vehicles and by the end of 2023 for diesel vehicles.

Decreasing the detection lower limit through refined PN measurement methods, formulating a suitable test method to evaluate dust from brake wear, and the strengthening of regulations on particulate matter for special vehicles are some of the topics being examined in preparation for the next report.

## (2) Fuel Economy

The passenger car fuel economy standards for 2030 were determined in June 2019. The WLTC will replace the current JC08 test cycle. The regulations were extended to cover EVs and PHEVs, and it was made mandatory for catalogs to show not only the overall WLTC AC power consumption rate, but also the values for the urban, suburban and highway driving environments, as well as the overall WLTC cruising range (distance that can be travelled on electric power on a single charge). The 2030 standard is 44.3% stronger than the 2020 standard (WLTC fuel consumption conversion).

In March 2019, a new fuel economy standard (JH25 mode) for 2025 was formulated for heavy-duty vehicles. Compared to the current 2015 fuel economy standard, it

strengthens the standards by 13.4% for trucks and 14.3% for buses. From April 2023, it will be necessary to list fuel consumption values in JH25 mode in the catalog.

In response to the government's announcement of the 2050 carbon neutral policy target in October 2020, the Ministry of Economy, Trade and Industry announced in its Green Growth Strategy in December 2020 that it aims to achieve 100% electric vehicles (including HEV) in new passenger vehicle sales by the mid-2030s. This, in turn, will lead to assessing how to apply fuel economy standards as well as to examining new policies. As part of this effort, it will be mandatory from October 2024 for new models and from October 2026 for existing vehicles to record and read out data such as lifetime/instantaneous fuel consumption values and battery deterioration levels, using an on-board fuel and power consumption measuring device (OBFCM).

## (3) Noise

According to the third *Future Policy for Motor Vehicle Noise Reduction* released by the Central Environmental Council of Japan, the UN R51.03 test method and regulatory values up to Phase 2 were introduced in 2016. They became mandatory for new models in September 2020 (postponed to September 2022 for the N2 category), and will become mandatory for existing vehicles in September 2022 (September 2023 for the N2 category). The timing for the introduction of Phase 3 is under assessment based on considerations such as surveys of technological forecasts, the progress of international standard examinations, and other regulations.

#### 4. 4. Other

Due to the revision of the *Road Transport Vehicle Act* in May 2019, a system for prior application and confirmation of software update standards compatibility for vehicles in use (vehicle specific remodeling permission system in Japanese) was established and has been applied since November 2022.

In addition, in the automobile inspection system, from October 2024, inspections using on-board diagnostics (OBD) will be conducted for carbon monoxide emission prevention devices, driving assistance devices, automated driving functions.

## 5 The U.S. and Canada

### 5. 1. General Trends

#### (1) U.S.

Regulations covering automotive structure include (a) vehicle safety regulations, (b) automobile emissions regulations, (c) regulations on automobile fuel economy, (d) federal noise regulations, and (e) regulations on hazardous substances.

(a) Vehicle safety regulations: The Federal Motor Vehicle Safety Standards (FMVSS) were instituted based on the National Traffic and Motor Vehicle Safety Act of 1966, with the National Highway Traffic Safety Administration (NHTSA) was established as their administrative organ with the Department of Transportation.

(b) Automobile emissions regulations: The passing of the Clean Air Act of 1970 and its amendments provided the basis for various regulations, with the Environmental Protection Agency (EPA) established as their administrative organ. Faced with a severe smog problem, the California Air Resources Board (CARB) had already established its own emissions regulations ahead of the federal government, and the State of California has since maintained the right to implement regulations differing from the federal ones.

(c) Regulations concerning automobile fuel economy The Energy Policy and Conservation Act of 1975 forms the legal foundation, with the NHTSA serving as the administrative organ and fuel economy calculations performed by the EPA. Manufacturers failing to meet the regulations are fined based on the extent to which they are below the requirements.

#### (2) Canada

Regulations covering automotive structure are similar to those of the U.S., and include (a) vehicle safety regula-

tions, (b) automobile emissions regulations, (c) regulations on automobile fuel economy, (d) federal noise regulations, and (e) recycling & SOC regulations. The contents of each regulation is essentially the same as its U.S. equivalent. The Canada Motor Vehicle Safety Standards (CMVSS) were instituted based on the Motor Vehicle Safety Act passed in 1970.

### (3) Certification Systems

Both the U.S. and Canada have a self-certification system for safety regulations, but an official certification system for emissions regulations. Certification must be obtained annually, even if models are not redesigned.

### (4) U.S. Socioeconomic Factors that Affect Automobile Regulations

On November 15, 2021, the *Infrastructure Investment and Jobs Act* was signed into law by US President Biden. In the future, infrastructure such as transportation will be developed based on this law.

### 5. 2. Vehicle Safety

The main trends are as follows.

(a) Proposal to shift ITS operation in 5.9GHz band from dedicated short-range communications (DSRC) to connected technology Cellular Vehicle-to-Everything (C-V2X) between vehicles X via mobile communications networks (NPRM: Notice of Legislation), May 2021.

(b) Accident information reporting order (Standing General Order) for vehicles equipped with automated driving systems, July 2021.

### 5. 3. Environmental Issues

#### (1) California

A carbon neutrality policy to ban the sale of new vehicles equipped with internal combustion engines by 2035, and achieve net zero carbon emissions for society as a whole by 2045 has been announced, and regulations based on that policy are under consideration.

(a) Emissions regulations: The LEV III regulations are currently in effect, and require compliance with the corporate average fuel economy regulations (NMOG + NO<sub>x</sub>), which become stricter every year. The PM regulatory value will also be raised to 1 mg/mile as of 2025. As regulations for 2026 model year and beyond, measures to reduce emissions in the actual market are being discussed, including further tightening of corporate average emission regulations, strengthening of evaporative emissions (running loss) during driving, and stricter emission testing methods. The OBD II regulations are also expected to be amended to include devices such as

control monitors under engine cold condition.

**(b) Greenhouse gas regulations:** In December 2021, the NHTSA under the Biden administration withdrew the rules issued by former President Trump regarding the deprivation of California's authority to establish its own regulations. In the future, there is a possibility that compliance with California's own regulations will be required.

**(c) ZEV regulations:** Compliance has been required for PHEVs, EVs, and fuel cell vehicles since the 2018 model year, and the mandated proportion of such models is rising every year. Regulations after 2026 model year are currently being discussed.

## **(2) U.S. Federal Government**

President Biden is emphasizing policies to address climate change, and a revision and tightening of the relevant regulations is foreseen.

**(a) Emissions regulations:** The EPA has implemented Tier 3 regulations that are largely harmonized with the California LEV III regulations. In addition, the OBD regulations have also been brought in line with those of California. If the regulations for the 2026 and subsequent model years are passed in California, federal regulations might follow a few years behind.

**(b) Fuel economy and greenhouse gas regulations:** Under the Trump administration, the EPA and NHTSA relaxed regulations from 2021 to 2026 model year. Under the Biden administration, the EPA announced that it would re-strengthen greenhouse gas regulations from 2023 to 2026 model year. The NHTSA is expected to strengthen fuel consumption regulations after 2024 model year.

## **(3) Canada**

The federal government of Canada has set a target of net zero greenhouse gas emissions by 2050.

**(a) Emissions regulations:** The Canadian federal government has adopted regulations equivalent to those of the U.S. Tier 3. At present, vehicles with a U.S. Tier 3 certification sold in Canada are not required to obtain the Canadian certification.

**(b) Greenhouse gas regulations:** As in the U.S., GHG regulations have been strengthened starting with the 2017 model year, but a higher multiplier has been set for advanced technology vehicles. When US federal regulations are reviewed, it is expected that the federal government of Canada will also follow stricter regulations.

**(c) ZEV regulations:** The federal government of

Canada has announced a goal of 100% ZEV for new vehicles by 2035. The province of Quebec has applied regulations similar to California's ZEV regulations since 2018 model year, and will review regulations with the goal of 100% ZEV in 2035. In British Columbia, ZEV regulations targeting 100% ZEV by 2040 were introduced from 2020 model year.

## **6 Europe**

### **6.1. General Trends**

#### **(1) EU Whole Vehicle Type Approval (WVTA)**

Obtaining Whole Vehicle Type Approval (WVTA) is mandatory in EU member countries (27 nations). The WVTA requires satisfying over 100 regulations on automobile structure and performance, including safety, emissions, noise, and fuel economy regulations. In addition, a new framework regulation (Regulation (EU) 2018/858) was published in July 2018 and came into effect for new models in September 2020.

The new regulation is not limited to requirements for vehicle structure. A wide range of provisions also cover stronger market surveillance, stricter certification inspections, defining the termination of validity of type approval, and mandatory access to OBD information and other maintenance information.

#### **(2) UK**

The UK government formally left the EU on February 1, 2020. Until December 31, 2021, the EU WVTA approval was temporarily carried over for the acquisition of UK-specific approval, however, the new models are required to acquire UK-specific approval from January 2022. The scheme will mandate essentially the same technical requirements as those of the EU WVTA.

#### **(3) Russia**

In the Eurasian Customs Union (EACU), whose member states include the Russian Federation, Kazakhstan, Belarus, Kyrgyzstan and Armenia, the Technical Regulation of the Customs Union (TR CU), a mutual approval system based on Russian regulations, came into effect.

### **6.2. Vehicle Safety**

The European Commission has set a long term goal of zero fatalities and injuries by 2050 (Vision Zero), and is preparing more stringent safety regulations as a step toward its midpoint goal (2030). The publication of the revised General Safety Regulation (GSR), (EU) 2019/2144 in December 2019, will make the installation of advanced emergency brake systems, lane departure prevention

systems, and other advanced safety systems mandatory. This is expected to reduce cases of fatalities by 25,000 and of injuries by 140,000 by 2038.

In 2021, (EU) 2021/535 (GSR Implementing Regulation), (EU) 2021/646 Emergency Lane Keeping System (ELKS), (EU) 2021/1243 (Alcohol Interlocks), (EU) 2021/1341 Driver Drowsiness and Attention Warning (DDAW), (EU) 2021/1958 Intelligent Speed Assistance (ISA) were newly issued. In addition, the issuance of new EU legislation (Event Data Recorder (EDR)) and introductions of UN-R152 (Advanced Emergency Braking System), UN-R153 (Fuel system integrity and electric power train safety at rear-end collision), UN-R155 (Cyber Security Management System), UN-R157 (Automated Lane Keeping Systems (ALKS)), and UN-R158 (Devices for means of rear visibility or detection) are being considered. For heavy-duty vehicles, the introduction of UN-R159 (Moving Off Information System (MOIS)) is also being considered.

### 6.3. Environmental Issues

Identifying climate change as its highest priority issue upon taking office in 2019, the current European Commission administration announced the Green Deal set of policies aimed at achieving carbon neutrality by 2050, and has been actively bringing the timetable of the previous administration's policies forward. In September 2020, the Commission announced a policy raising the CO<sub>2</sub> reduction target for 2030 from the original 40% compared to 1990 to at least 55%.

A CO<sub>2</sub> emissions (fuel economy) regulation for light-duty vehicles imposing reductions of 15% in 2025, and 37.5% (passenger vehicles) or 31% (commercial vehicles) in 2030 compared to 2021 values was published in 2019. The European Commission has submitted a package of comprehensive revision bills, Fit for 55, including infrastructure and fuels that have received the European Green Deal. One of them is a proposal to strengthen the CO<sub>2</sub> emission regulations for automobiles, and European Commission is considering to increase the CO<sub>2</sub> emission reduction from 37.5% to 40 to 60% for passenger vehicles. Based on the premise that CO<sub>2</sub> emissions from new vehicles will have to reach zero by 2035 to 2040 to ensure carbon neutrality is achieved for all vehicle traffic, including aged vehicles, by 2050, a policy to ban the introduction of internal combustion engines is also under consideration. In response to the issuance of a regulation in 2017 that aims to reduce CO<sub>2</sub> emissions from heavy-duty vehicles by 15% by 2025 and 30% by 2030 compared to

2019, monitoring of CO<sub>2</sub> (fuel consumption) using the simulation tool (VECTO) provided by the European Commission has been implemented step by step by allowable gross mass since 2019, and review was scheduled to be conducted in 2022.

As for exhaust emissions, the tightening of Euro 6 regulations, which is expected to start around 2027, is being considered at the same time as the tightening of Euro VI for heavy-duty vehicles. The European Commission view the post Euro 6/Euro VI as the final emissions regulations for internal combustion engines, and CLOVE, the consortium charged with studying the contents of the regulations by the Commission, has announced plans to define regulations requiring the best available technology for reducing emissions.

## 7 China

### 7.1. General Trends

Regulations concerning automobile structure are stipulated in the Chinese national standards (GB) established under the Standardization Law of the People's Republic of China, and product certification and registration (acquisition of a license plate) can also require compliance with recommended national standards (GB/T), industry standards (e.g., GA, QC/T) and local standards (DB).

Product certification is based on the China Compulsory Certificate (CCC) system and involves inspections to verify compliance with the GB, GB/T and other standards, stipulated in the certification implementation rules established by the Certification and Accreditation Administration of the People's Republic of China (CNCA). Additionally, there is a two-tier certification system in place for completed vehicles produced in China. The second tier, based on the implementation rule for producers of motor vehicles and products and the implementation rule for producers of new energy vehicles and products established by the Ministry of Industry and Information Technology, involves inspecting the corporate framework and products as a whole and granting a production license.

### 7.2. Safety

#### (1) Progress of Measures to Expand Advanced Safety Technologies

Various policies and plans aimed at expanding connected cars (intelligent and connected vehicles (ICVs)) have been promoted over the years. According to the guidelines on building a standards framework for national ICV production formulated under the guidance of the



Ministry of Industry and Information Technology, ICV standards covering over 100 items, including advanced automated driving, are slated to be established by 2025. In the Guidelines for ICV Manufacturers and Product Entry Permission Management (in Japanese), which was solicited in April 2021, the requirements for producing and selling ICVs equipped with automated driving functions in China are announced officially.

In 2021, in addition to AEBS related to ADAS technology and general technical requirements related to cyber security, a new GB/T related to in-vehicle information mutual communication system and gateway requirements was issued. A new GB for EDR was applied in January 2022. More than 20 new items of ADAS technical standards, cyber security standards, and automated driving standards have been formulated.

The Ministry of Transport has issued its own JT/T vehicle safety standards for commercial vehicles in operation. The standards require the mandatory installation of electronic braking (EBS), advanced emergency braking (AEBS), vehicle stability control (ESC), lane departure warning (LDWS) and tire pressure monitoring (TPMS) in certain applicable models.

## **(2) Other Standards**

In March 2021, GB for steering system basic requirements, in August 2021, post-collision safety requirements for electric vehicles and EMC requirements for conductive charging, and in December 2021, new GB/T for seat belt reminders were issued. Currently, the GBs for indirect vision, road lighting devices, optical signal equipment, retroreflectors, pedestrian collision protection, and so on are being revised.

## **7.3. Environmental Issues**

### **(1) Policy Trends Concerning Energy-Saving and New Energy Vehicles**

In October 2020, the China Society of Automotive Engineers (China SAE) released the *Energy-saving and New Energy Vehicle Technology Roadmap 2.0*. The 2.0 roadmap outlines the development vision and goal of automotive technology in China from 2025 to 2035, and sets gradual targets such as new energy vehicles (NEVs) accounting for 50% of new vehicles and having hybrid vehicles (HVs) represent 100% of conventional energy vehicles by 2035.

In November 2020, the State Council promulgated the *New Energy Vehicle Industrial Development Plan (2021-2035)*. The plan presents the specific goals of 20% share

for new energy vehicles (NEVs) in new vehicle sales by 2025 and 12.0 kWh/100km as an average electricity consumption of electric vehicles (EV).

## **(2) Emissions Regulations**

The China 6 regulation was issued for light-duty vehicles in 2016, replacing the previous European NEDC with the WLTC and setting the same normal temperature emissions regulatory value for both gasoline and diesel vehicles. Another distinctive point is the adoption of partially modified versions of the European real driving emissions (RDE) regulations, as well as the U.S. evaporative emissions, on-board refueling vapor recovery (ORVR) regulations, and on-board diagnostics (OBD) regulations.

Regulatory values are being strengthened in two phases, with China 6a scheduled to apply in July 2020 (postponed to January 2021 due to COVID-19), and China 6b coming into effect in July 2023. The latter, notably, imposes stricter regulatory values than Euro 6.

The sixth-stage GB regulations for heavy-duty vehicles were issued in 2018. In addition to the inclusion of new items such as PN regulations, off-cycle emissions regulations, and a term for emissions quality certification, the existing emissions compliance requirement for stand-alone engines was complemented with the addition of bench test emissions measurements for completed vehicles, on-road emissions measurement tests (PEMS), on-board devices for remote monitoring, and other vehicle requirements.

To strengthen usage environment requirement conditions, regulation are enforced in two stages; namely, China 6a and China 6b. The date of enforcement is set according to the usage of the vehicles, for example, for gas-fueled vehicles, city vehicles (public vehicles), and all general vehicles; implementation of China 6a for all vehicles is July 2023 and China 6b for all vehicles is July 2023.

## **(3) Fuel Economy and NEV Regulations**

Fuel economy standards for light-duty passenger vehicles include both corporate average fuel consumption (CAFC) and individual vehicle fuel economy regulations, which are being implemented in five stages since January 2021. The fifth-stage CAFC regulations replace the current European NEDC with the WLTC, while effectively tightening the regulation by a little over 20% compared to the fourth stage (WLTC converted regulatory values). For individual vehicles, the fourth-stage simply switches to converting to WLTC fuel economy values

without further tightening of the regulation. In addition, it was decided that off-cycle credits was adopted in CAFC regulations from the 5th stage, and preferential treatment would be given to regenerative braking systems and high-efficiency air conditioners until 2023.

Similarly, legislation on the concurrent management of CAFC and NEV fuel economy credits (valid from 2018 to 2020) was issued in 2017 and enacted in April 2018. In June 2020, a revised version incorporating rules for 2021 to 2023 was issued. Although the enforced ratio of NEV credits relative to the production and import of conventional energy vehicles becomes stricter every year, the rules also include a preferential scheme for the count of conventional energy vehicles that meet the definition of fuel-efficient vehicles. Taking the impact of the COVID-19 pandemic into account, special regulation easing measures limited to 2020 were issued separately in February 2021. In April 2021, regulations related to new energy vehicles, such as technical requirements for electric vehicles and energy consumption test methods, were added to the *Regulations on New Energy Vehicle Manufacturing Enterprises and Product Access Management* (in Japanese). In addition, the technical requirements for the purchase tax exemption, which gives preferential treatment to new energy vehicles, have been updated.

Fuel economy for heavy-duty vehicles used in commercial operations is subject to two different test methods and regulatory values, namely the Phase 4 Ministry of Transport regulations and the Phase 3 Ministry of Industry and Information Technology regulations.

A driving mode GB standard was recently released for the Ministry of Industry and Information Technology Phase 4 regulations, and revisions to the regulatory values and test methods will be examined.

#### **(4) Noise Regulations**

Acceleration noise regulations equivalent to UN R51.02 (phase 2) and stationary noise regulations are currently in effect. A draft law to integrate acceleration noise regulations (phases 3 and 4) and stationary noise regulations into a single GB standard for the next regulations is under examination.

## **8 Asia & Oceania**

### **8.1. General Trends**

In the ASEAN, establishing a Mutual Recognition Agreement (ASEAN MRA) in the automotive field has been discussed for many years since the ASEAN heads

of state signed the mutual recognition framework agreement in 1998. In January 2021, the approval of all member countries was completed, and from January 2022, some items started to be applied. In the future, it will be introduced gradually by member countries as they complete amendments to their legislation. For the time being, applicability is limited to the products manufactured in the ASEAN region, allowing the use of test reports from any of the countries in that region by all member countries. This is projected to simplify approval procedures.

### **8.2. India**

Technical standards; Indian Standard (IS) and Automotive Industry Standard (AIS) are established under Central Motor Vehicle Rules (CMVR) and are being harmonized with the latest UN-R/GTR. The introduction of up to 2,500 European- or Japanese-approved vehicles per manufacturer per year.

The collision safety regulations for offset frontal collisions, side collisions, and pedestrian protection have reached the date of application to all vehicles, and regulations equivalent to those in Europe have been prepared. In addition, requirements for composite electronic control of brakes have begun to be regulated. The safety conformity of production (CoP) rules for markings and simplified inspections are under consideration.

Bharat Stage VI (BSVI), which corresponds to European emissions regulation Euro 6, has been applied since April 2020. Real driving emissions regulations are planned for April 2023, and regulatory values are currently under discussion. The country has also decided to introduce regulations on fuel economy and fuel economy label for new vehicles. Stage 1 of corporate average fuel consumption regulations for compact passenger vehicles have been applied since April 2017. A tightening of fuel economy regulations is planned for April 2022.

For heavy-duty vehicles, OBD2 and RDE are scheduled to be added to BSVI from April 2023. Furthermore, it is proposed to strengthen noise regulations in April 2024 and introduce AEBS regulations in October 2024.

### **8.3. Indonesia**

The Indonesian government has been promoting the popularization of electric vehicles, and by order of the president, new laws and regulations concerning the type approval of electric vehicles have been enacted independently. The requirements for EVs have been strengthened, such as the adoption of UN-R100 (Construction and Safety of Electric Powertrains.) and UN-R138 (Acoustic

Vehicle Alerting System). There are also plans to build a large-scale testing facility capable of conducting tests for all items in the ASEAN MRA.

The application of Euro 4/IV regulations to gasoline vehicles in 2018 and diesel vehicles in 2021 was decided in 2017. However, the impact of the COVID-19 pandemic resulted in pushing enforcement for diesel vehicles back one year to 2022. Regarding fuel consumption, a tax system according to fuel consumption started in 2021.

#### **8. 4. Thailand**

The Department of Land Transport (DLT) has systematically expanded the adoption of UN-R items every year. Most recently, adoption of UN-R100 (Construction and Safety of Electric Powertrains) in 2023 and UN-R13 and UN-R13H (Braking equipment/N1, M1) in 2024 is scheduled. However, even if the technical requirements are the same as in the UN regulation, adaptations such as instituting Thai-specific plant audit (CoP) requirements are made and the approval in the UN regulation is not taken as is. In addition, the Thai Industrial Standards Institute (TISI) published the final draft of collision safety standards in 2021. Aiming to make UN-R94 (Occupant Protection in Frontal Collisions) and UN-R95 (Occupant Protection in Side Collisions) obligatory by 2024, coordination is being made with related ministries.

Following the formulation of a national policy to address PM 2.5 and other air pollution issues, the Ministry of Industry is looking into moving Euro 5/6 adoption forward. Despite a push to enact Euro 5, in particular, for all vehicles in 2021, a proposal to postpone Euro 5 presented by the industry was accepted by the National Environment Board. Regarding the timing of application of Euro 5/6, discussions are ongoing among relevant ministries, agencies and industry, and the final decision was expected to be made in the first half of 2022 after discussions at the Cabinet meeting.

#### **8. 5. Malaysia**

Emissions regulations were scheduled to be strengthened to Euro 4/IV from July 2020 for gasoline vehicles and from October 2022 for diesel vehicles. Exterior noise regulations are planned to be tightened to UN-R51/02 around the same time as emissions regulations are strengthened. Malaysia has adopted the largest number of UN-Rs among ASEAN countries, and is showing signs of considering the introduction of 13 new UN-Rs in the future.

#### **8. 6. Vietnam**

From January 2022, emissions regulations are scheduled to be strengthened to Euro 5/V. In addition, in November 2021, the Prime Minister's Decision (1973/QD-TTg) announcing the *National Plan for Air Quality Management for 2021-2025* was promulgated, and the Ministry of Natural Resources and Environment is expected to examine a roadmap for tightening emissions regulations within 2022.

#### **8. 7. Cambodia**

In response to the ASEAN MRA trend, Cambodia decided to introduce 16 UN-Rs from 2022 to 2024 for light-duty passenger vehicles and light-duty commercial vehicles.

#### **8. 8. Taiwan**

Harmonization with UN regulations is underway, but rather than being unconditional, their introduction is based on a careful examination of the requirements and test by the nation's own testing institute. The procedure, starting with the examination of the application documents, is carried out extremely strictly.

The Euro VI emissions regulations have applied to new models since September 2019, and to existing vehicles since September 2020. Applying RDE regulations to gasoline vehicles is also being considered. With respect to fuel economy, stronger CAFE regulations will apply in 2022. The sixth-stage noise regulation has been issued. As with the UN R51.03 on vehicle exterior noise serving as a model, the regulation will be applied in three stages.

#### **8. 9. Australia**

The Australian Design Rules (ADR), which include unique requirements, are being harmonized with UN regulations. It is currently possible to use compliance with UN regulations cited in the ADR or the latest subsequently issued version thereof to submit an application. From July 2021, the new certification system; The Road Vehicle Standards Act 2018(RVSA) was applied to new models. Existing vehicles are required to switch to certification under the new certification system during the one-year transition period.

In terms of safety related, ADR98 was enacted in October 2021 to obligate installation of AEBS equipment. The technical requirements of UN R152 for vehicles will be applied from March 2023 to new vehicles, from March 2025 to existing vehicles, for pedestrians, the requirements will be applied from August 2024 to new vehicles, and from August 2026 to existing vehicles. For heavy-

duty vehicles, a proposal to apply UN R131 technical requirements to new models in November 2022 and to existing vehicles in January 2025 has been made.

Government authorities is said to have proposed Euro 6d (WLTP mode) for light-duty vehicles and Euro VI for heavy-duty vehicles as the next emissions regulations, which would come into effect in July 2027 for new models and July 2028 for existing vehicles. Federal Chamber of Automotive Industries (FCAI) of Australia has decided on self-regulations for CO<sub>2</sub>, setting from 2020 to 2023 as voluntary compliance period and from 2024 to 2030 as mandatory compliance period.

## 9 Central and South America

### 9.1. General Trends

While several countries have started producing vehicles since the 1950s, many nations still have out-of-date regulations. The Brazil and Argentina-led Southern Common Market (MERCOSUR) is working on establishing regulations with an eye toward harmonizing them with those of the UN.

### 9.2. Mexico

Although strongly influenced by the U.S., Mexico accepts regulations from the U.S., UN/EU, China, India, Brazil and Japan. Mexico has started studying the adoption of advanced safety regulations, including pole side collisions and AEBS.

Emissions regulations equivalent to Euro 4/Tier 2-Bin7, which are currently based on European and American regulations, have now been introduced. The Mexican government proposed to strengthen the regulations in stages to Euro 5/Tier 2-Bin5 and Euro 6/Tier 3 in 2018, but the specific timing of the tightening the regulations has not been decided. In an effort to reduce greenhouse gas emissions, CO<sub>2</sub> regulations aligned with those of the U.S. are in effect. The government is reevaluating its 2018 proposal to make those regulations stricter for the 2019 and subsequent model years. For heavy-duty vehicles, the current Euro V/EPA07 to Euro VI/EPA10 will be applied from January 2025.

### 9.3. Brazil

The introduction of Rota 2030 (an automotive policy meaning Route 2030), which aims to stimulate domestic production, and encourage technology transfers, and offers tax incentives for early compliance with regulations, is advancing efforts to harmonize its collection of regulations dating to the 1980s with UN regulations.

The next emissions regulations (L7 regulations: as of January 2022, L8 regulations: as of January 2025) were finalized at the end of 2018. These Brazil-specific regulations use those of the U.S. as a basis while also adding stipulations such as the real driving emissions (RDE) tests introduced in Europe. The government and industry have been debating the details of the various test items since 2019. Fuel economy standards intended to revitalize Brazilian automobile production and increase competitiveness are stipulated in the Rota 2030 government policy. Regulations for gasoline and flexible fuel vehicles came in effect in 2019, and will apply to diesel vehicles in 2022. Currently, regulation values up to 2026 have been decided, and it is expected that discussions on regulation values after 2027 will also start.

### 9.4. Argentina

Argentina accepts the laws and regulations of the United Nations, Europe, and the United States. In recent years, no new regulations have been adopted, but there are some features such as requiring a report in Spanish for approval applications.

There have been few movements in emissions regulations since the application of Euro 5/V in 2015. Although there is a movement to start discussions on Euro 6/VI, which will be the next regulation, full-scale discussions have not yet started. With respect to fuel economy and CO<sub>2</sub>, the application of fuel economy labels became mandatory in June 2020 as a step toward the final goal of formulating fuel economy standards.

## 10 Middle East and Africa

### 10.1. Gulf Cooperation Council (GCC)

Given the lack of a concentrated automotive industry in its region and the influx of a large variety of vehicles from various parts of the world, the GCC Standardization Organization (GSO) vehicle structural regulations consist of stipulations to comply with UN regulations and the FMVSS, with many cases involving choosing to comply with one or the other. The GSO regulations are also characterized by giving precedence to stipulating mandatory installation requirements, and by allowing compliance with either UN regulations/FMVSS or the regulations of the region of origin for technical requirements.

Although the movement to revise GSO regulations has slowed down in recent years, under the surface, consideration is underway to make it mandatory to equip vehicles with advanced preventative safety equipment such

as back guide monitors, CMS (Camera-Monitor System), AEBS, and LKA (Lane Keeping Assist), etc.

The GSO has notified that the UAE will obligate emissions regulations equivalent to Euro 6/VI from 2025 model year for gasoline and diesel vehicles.

Regarding heavy-duty vehicles, the requirements for buses are being strengthened, and Saudi Arabia will start applying structural requirements and under-run protection devices for buses from the 2023 model year.

## 10. 2. South Africa

Regulations based on those of the UN have been adopted, but they have not been updated in many years and out-of-date requirements remain in effect. Discussions to update to the latest regulations and introduce new requirements in 2025 have finally begun under the impetus provided by the Safer Cars for Africa campaign launched by Global NCAP.

Tighter regulations (Euro 5) from the current emissions regulations (Euro 2) are being considered.

# 11 Motorcycles

## 11. 1. Japan

### (1) Vehicle Safety

The installation of motorcycle lighting devices (UN-R53/03) for L3 category, regardless of whether or not DRL is installed, is based on the results of discussions at the United Nations regarding passing beam requirements and will be introduced to new models excluding motorcycle type I from September 1, 2023 and to new models of motorcycle type I including L1 category from June 15, 2025. There is no application deadline for existing motorcycles.

Concerning the unification of laws and regulations for individual lighting devices, (New) UN-R148 (light-signaling devices) from (old) UN-R50, (new) UN-R149 (Road illumination devices) from (old) UN-R112, 113, (new) UN-R150 (Retro-reflective devices) from (old) UN-R3 signaling device are scheduled to be applied from November 15, 2021. It should be noted that it was possible to newly acquire the old regulations until November 14, 2021, and after November 15, 2021, it was possible to apply for an extension of the old regulations.

As for advanced brakes, the content reflects the revision of brakes (UN-R78), and ABS must be installed on the motorcycles with a displacement of over 125 cm<sup>3</sup>, and ABS or CBS (Combined Brake System) must be installed on motorcycles with a displacement of over 50

cm<sup>3</sup> and up to 125 cm<sup>3</sup>. It was scheduled to be applied to new models from October 1, 2018, and to existing and imported motorcycles from October 1, 2021.

### (2) Emissions

The fourth emissions regulations based on GTR2 exempts WMTC mode class 0, which continues the motorcycle mode, including evaporation requirements (1.5g/test) and J-OBBD II requirements (OTL1) are planned to be applied to the new models from December 1, 2020, to existing motorcycles excluding motorcycle type I from November 1, 2022 and to existing motorcycles of motorcycle type I from November 1, 2025. Regarding the catalyst monitor as a J-OBBD II requirement (OTL2), it will be applied to the new models of mini-sized/small motorcycles from December 1, 2024, and existing motorcycles of mini-sized/small motorcycles from November 1, 2026. However, for the motorcycle type II, it will be applied to new models of mini-sized/small motorcycles from December 1, 2025, which is one year behind the schedule, and to existing motorcycles of mini-sized/small motorcycles from November 1, 2027. Motorcycles of type I are treated as a category unique to Japan and does not depend on GTR, so J-OBBD II requirements (both OTL1/OTL2) are not applied, and only J-OBBD I requirements are applied. In addition, regarding the catalyst monitor, exemption regulations are being discussed after classifying them into for small motorcycles, mini-sized motorcycles, and motorcycles of type II.

### (3) Noise

Motorcycle noise regulations (UN R41/04) have been applied to new models from January 2014, and to existing motorcycles from January 2017, targeting the L3 category. In addition, due to the strengthening of the ASEP test method (ASEP2.0) accompanying the revision of UN-R41/05 and the extension of the deceleration section by 20m, motorcycle noise regulation as UN-R41/05 will be applied to new models from September 1, 2023, and to existing and imported motorcycles from September 1, 2024, targeting the L3 category.

In addition, the test range of ASEP2.0 will be expanded by adding throttle operation/adding the number of measurement points.

However, since this is not tightening the regulation values, there will be no change in the motorcycle noise regulation category, therefore, there is no change from the current purple label color of the type approval number indicating the applicable noise regulation category

for mini-sized motorcycles, motorcycles of type I and types II. UN-R41/06, which will be the next motorcycle noise regulations for motorcycles, is currently in pre-consideration stage in Japan and will be considered in the future.

## **11. 2. U.S.**

### **(1) Vehicle Safety**

Equipping of motorcycles with adaptive driving beam (ADB) was approved in the Official Gazette of February 2022. (Federal Register/Vol. 87, No. 35/Tuesday, February 22, 2022)

### **(2) Environmental Protection**

Amendments to bring the emissions regulations up to the Euro 5 level are being considered by the state of California. It is expected to be introduced from new models in the 2024 model year at the earliest.

## **11. 3. Canada**

There were no significant changes in the laws or regulations.

## **11. 4. Europe**

A new uniform vehicle type certification (Whole Vehicle Type Approval [WVTA]) framework regulation ((EU) 168/2013) was issued in 2014, and came into effect in January 2016 for motorcycles.

Type approval consists of the framework regulation and the delegated regulations on environmental and propulsion unit performance ((EU) 134/2014, as amended by (EU) 2016/1824, (EU) 2018/295) and (EU) 2019/129, on functional safety ((EU) 3/2014, as amended by (EU) 2016/1824), and on vehicle construction ((EU) 44/2014, as amended by (EU) 2016/1824 and (EU) 2018/295), and the implementing regulation ((EU) 901/2014, as amended by (EU) 2016/1825 and (EU) 2020/239).

An amended framework regulation ((EU) 2020/1694) was issued in November 2020 in the context of specific measures for end-of-series vehicles in response to the COVID-19 pandemic.

As the UK withdraws from the European Union, the UK has not automatically accepted the European WVTA from January 2021. SO, it is necessary to obtain a provisional UK type approval based on the European WVTA approval. Vehicle Certification Agency (VCA) of the UK is considering how to obtain formal type approval.

### **(1) Vehicle Safety**

Although motorcycles have been excluded for the time being, consideration of general safety standards including cyber security is underway.

## **(2) Emissions**

In accordance with the delegated regulation ((EU) 2019/129), Euro 5 is set to apply to new models starting in January 2020 and to existing vehicles starting in January 2021. Some OBD Stage II functionality (catalyst monitors) will apply to new models as of January 2024 and to existing vehicles as of January 2025 as part of Euro 5+.

### **(3) Noise**

The motorcycle noise regulation (UN-R41) cited in the European WVTA has already been issued as UN-R41/05 (RD-ASEP) as an amendment of the additional noise regulation (ASEP) to the current regulation UN-R41/04 and it will be compulsory to apply it to new models from September, 2023. Discussions are currently underway on the review of the next noise regulation values.

## **11. 5. China**

In terms of safety, the passenger hand hold and footrest regulations have been revised, and have been applied to new models since January 2022, and will be applied to existing motorcycles from January 2024. In addition, revisions to regulations (GB 18100, etc.) regarding the performance and installation of lighting devices are being considered, and it is expected that Class B headlamps with symmetrical light distribution will be prohibited.

In terms of the environment, China's stage IV standard (equivalent to Euro 4) is currently being applied as emissions regulations, and China's V stage standard (equivalent to Euro 5) is being considered as the next regulation. The amendment of noise regulations equivalent to UN R41.04 is also being examined.

## **11. 6. Asia & Oceania**

### **(1) India**

In terms of safety, regulations on stands, external projections, and footrests have been applied since January 2022. In addition, revisions are planned for the lighting device regulations and the lighting equipment installation regulations.

In terms of the environment related, emissions regulations Bharat Stage (BS)-VI equivalent to Euro 5 are currently applied, and OBD-Stage II is scheduled to be applied in April 2023.

As for noise regulations, IS3028:2018 (equivalent to UN-R41/04) is scheduled to become obligatory, and application is already available.

In addition, a recall is obligatory in April 2021, and Whole Vehicle Safety COP (WVSCOP) is scheduled to be

applied in December 2022.

### **(2) Indonesia**

In Indonesia, emissions regulations equivalent to Euro 4 (TYPE 1 & 2) are under consideration, planning to apply the regulations to new models in December 2024 and to existing motorcycles around December 2026. The Official Gazette is expected to be published in 2022. Regarding noise regulations (UN-R41/04), although it will be enforced for new models first, then for existing motorcycles from October 2023, but operation will proceed in stages while waiting for the completion of the equipment.

### **(3) Thailand**

In terms of safety, horn regulations (equivalent to UN R28/00) were applied to new models from January 2018 and to existing motorcycles from January 2020, and tire regulations (equivalent to UN-R75) were applied from January 2019. Brake regulations (equivalent to UN-R78/04) have been applied to new models since January 2022, and will be applied to existing motorcycles in January 2024. In addition, mandatory installation of advanced brakes (ABS/CBS) will be applied to new models from January 2024 and existing motorcycles from January 2026. Also, installation of speedometers (equivalent to UN-R39/01) and lighting devices (equivalent to UN-R53/01) is also being considered to be applied to new models.

For the environment aspects, regarding the emissions regulations, the 7th stage of emissions regulations equivalent to Euro 4 (all items except OBD are target) have been applied since March 2020.

Noise regulations (equivalent to UN-R41/04) have been applied to new models since January 2022, and will be applied to existing motorcycles from January 2024.

### **(4) Malaysia**

Concerning emissions regulations, the local automakers' association and the government have begun discussions on Euro 5 (TYPE1&2) and noise regulations (UN-R41/05). In the present proposal, it seems that consideration has started with the plan of applying the regulations to new model in 2027 and to existing motorcycles in 2029. The introduction of OBD2 has also started, but the schedule is undecided.

Approval of new lighting device (UN-R148, 149, 150) is scheduled to start in the first quarter of 2022. Each UN-R certificate already obtained can continue to be used.

### **(5) Vietnam**

Regarding the emissions regulations, TYPES 1, 2, 4

(imported vehicles may not be applicable), 5, and 7 are under consideration based on Euro 4. The Official Gazette is scheduled to be published by the end of 2022. Vietnam is considering applying the regulations to new models two years after the publication of the Official Gazette, and to apply them to existing motorcycles from 2026.

### **(6) The Philippines**

The Philippines is considering to incorporate horn regulations (UN-R28/00), tire regulations (UN-R75/00), and speedometer regulations (UN-R39/01) in terms of safety. In addition, the introduction of new approval of single-unit part for lighting devices (UN-R50) and mirrors (UN-R81) is considered.

In terms of the environment, the emissions regulations equivalent to Euro 3 are currently being applied, and incorporation of regulations equivalent to Euro 4 is being considered. As for the noise regulations, incorporation of noise regulations equivalent to UN R41/03 or higher is also being examined.

### **(7) Singapore**

In terms of the environment, the emissions regulations equivalent to Euro 4 have been applied since 2018 for motorcycles with a displacement of over 200 cm<sup>3</sup> and since 2020 for motorcycles with a displacement of 200 cm<sup>3</sup> or less. Regarding the noise regulations, the introduction of UN-R41/04 has been decided from April 1, 2023.

### **(8) Taiwan**

In terms of safety, from January 2019, only new models were required to be equipped with ABS or CBS, similar to Europe. For the environmental concern, regarding emission regulations, the 7th stage of emission regulations (equivalent to Euro 5, but with unique requirements) have been applied to new models since January 2021, and to existing motorcycles since January 2022. In addition, fuel consumption regulations have been revised and are in effect from January 2022. The 6th stage of noise regulations (equivalent to UN R41/04, with independent regulation values for proximity exhaust noise) has been applied.

### **(9) Hong Kong**

Regarding the environment, for the emissions regulations, European Euro 5 or Japanese regulations (2020 regulations) are applied. Concerning the noise regulations, compliance with European regulations (168/2013/EC) or Japanese regulations (2016 regulations) is re-

quired.

### **(10) Australia**

A new vehicle law, Road Vehicle Standard Act (RVSA), has been issued and has been applied since July 2021.

For the safety aspects, Australia has decided that front and rear ABS should be installed as advanced brakes on motorcycles with a displacement of 125 cm<sup>3</sup> or more, and front and rear ABS or CBS should be installed on motorcycles below 125 cm<sup>3</sup>. Installation of such advanced brakes have been compulsory for new models from November 2019 and for existing motorcycles from November 2021, but there are no other major movements in other laws and regulations at present.

## **11. 7. Central and South America**

### **(1) Brazil**

The mandatory installation of ABS or CBS for vehicles with a displacement below 300 cc (output below 22 kW), and for ABS for those with a displacement of 300 cc or higher (22 kW or more) has gradually been made mandatory, came into effect in 2019.

UN regulations on lighting devices and mirrors were used as a basis to amend domestic laws, which were applied to production of motorcycles and to motorcycles clearing customs starting in January 2019.

Regarding horn and electrical safety, domestic laws have been revised based on UN regulations, and are scheduled to be applied from January 2022 onwards for production and customs clearance.

In terms of environment, although the second-stage regulation of emissions regulations PROMOT M4 are in effect, the application of PROMOT M5 (stricter regulations, extended durability distance, addition of evaporative diurnal test, addition of requirements about aldehyde and OBD (M1)) will be applied to new models in January 2023 and to existing motorcycles in January 2025, and OBD (M2) will be applied to new models from January 2025 and to existing motorcycles in January 2027.

Strengthening the current noise regulations, which are equivalent to UN R41.03, to make them equivalent to UN

R41.04 is under consideration.

### **(2) Argentina**

In terms of safety, additional requirements such as stands, fuel tanks, external projections, devices to prevent unauthorized use, and passenger handholds are scheduled to be applied to new models from June 2021 and to existing motorcycles from January 2023.

As for advanced brakes, ABS will be required for motorcycles with a displacement of over 250 cm<sup>3</sup>, and ABS or CBS will be required for motorcycles with a displacement of over 50 cm<sup>3</sup> and up to 250 cm<sup>3</sup>. Application timing of this obligation is considered to be January 2024 for new models and January 2026 for existing motorcycles.

### **(3) Peru**

The Euro 3 emissions regulations came into effect on January 1, 2017.

### **(4) Chile**

For environment concerns, only the Euro 3 regulations were applied to the emissions regulations from March 2019, and noise regulations equivalent to UN-R41/03 was applied from July 2019.

In terms of safety, the mandatory installation of advanced brakes (ABS or CBS) for motorcycles started in stages from February 2022.

### **(5) Columbia**

In relation to the environment, emissions regulations were issued in September 2019, and regulations equivalent to Euro 3 were applied to vehicles produced and cleared customs from January 2021 onwards.

Safety regulations that make the installation of advanced brakes (ABS or CBS) mandatory in stages are under consideration.

## **11. 8. Middle-East**

### **Gulf Cooperation Council (GCC)**

Currently, environment and safety-related laws and regulations have been introduced, and from January 2020, the vehicle category of the vehicle certification system for motorcycles is compliant with European standards.