THE AUTOMOBILE AND TECHNICAL REGULATIONS

1 Introduction

This article presents recent trends in automotive structure and performance 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. Vehicle Safety

(1) Active Safety

Beyond measures that mitigate damage in accidents, active and preemptive approaches to prevent accident themselves have become important. In Europe, active safety standards such as those for advanced emergency braking systems (AEBS) have been revised, and standards for emergency lane-keeping systems (ELKS), driver drowsiness and attention warning (DDAW) systems, and intelligent speed assistance (ISA) systems have also been established.

(2) Automated Driving

The sensors and actuators developed for active safety, along with advances in the computerization and digitalization of vehicles, have 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. Conventional legislation on automobile structure and road traffic assumes a driver is always present to operate the vehicle, and various countries are therefore preparing legislation that accounts for automated driving.

(3) Cybersecurity and Software Updates

The adoption of various technologies in the field of automated driving has enabled the use of networks to control the vehicle and update installed software. This is achieved through 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 update process critical. Consequently, a management system certification that inspects the management framework of the manufacturer has been added to regulations covering this field.

2. 2. Emissions, Fuel Economy (CO_2), 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 concerning 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. The scope of emissions evaluations, which initially covered gas emissions from the exhaust pipe (tail pipe emissions), has also expanded to evaporative emissions from the fuel system (evaporative emissions), gas emissions during refueling (refueling emissions), and regulations for on-board diagnostics (OBD) systems. Evaluation test method for tailpipe emissions have also change. Initially consisting of a basic driving cycle test under standard conditions in various countries, they expanded to add low-temperature/high-altitude conditions evaluations, off-cycle driving tests, and reached harmonization with UN standards with the Worldwide Harmonized Light Vehicle Test Cycle (WLTC). They then evolved into the real driving emissions (RDE) regulation, which makes it mandatory for manufacturers to conduct actual on-road emissions tests using vehicle mountable exhaust gas inspection equipment.

(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. These regulations assign fuel economy standards by vehicle and size, and require the weighted average fuel economy of new vehicles to meet the regulatory values. However, with global warming becoming a worldwide social issue starting in the 1990s, various countries followed in the footsteps of Japan and Europe in establishing automotive fuel economy and CO_2 emissions regulations as part of measures to address emissions of the CO_2 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_2 emissions is proportional to the amount of fuel used, CO_2 emission regulations have the same significance as fuel consumption regulations, and mainstream regulations consist of CAFE regulations.

(3) ZEV Regulations

In the U.S., the state of California has zero emission vehicle (ZEV) regulations in addition to those on emissions and those on fuel economy and greenhouse gases. 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 that percentage, that manufacturer has to purchase the credit shortfall from other manufacturers who have surplus credit. A fine is imposed if the deadline for making up the shortfall is not met.

(4) Noise Regulations

In 1988, the UN WP.29 established 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 for the 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 Concern and Recycling

(1) Vehicle Regulations

Harmful substances released from abandoned or dismantled vehicles, as well as the issue of resource recycling, led to concerns about the burden on the environment. These concerns led Europe to enact the End-of-Life Vehicles (ELV) Directive, which stipulates requirements for certification of recyclability rates, as well as obligatory marking of material indications for resins and rubbers, in 2000. The directive also stipulates banning the use of four types of environmentally hazardous substances (lead, mercury, cadmium, and hexavalent chromium). Exemptions made due to the lack of substitute technologies have been revoked as new technology was developed, and the timing for introducing the ban on lead batteries is currently being debated. At the same time, changes such as the progress of electrification and the transition to a recycling economy and carbon free society have led the European Parliament to discuss revisions to the current ELV Directive.

Outside of Europe, Turkey, Israel, Korea, China and Vietnam 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

Among international conventions, the Stockholm Convention governing persistent organic pollutants (POPs) already designates brominated flame retardant and fluorine compounds as substances for elimination on an international level. The addition of Dechlorane plus (polychlorinated flame retardant) and UV-328 (UV absorber) is under consideration, paving the way for the worldwide elimination of those substances.

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, 224 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.

Table 1 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

3 United Nations

3. 1. International Harmonization of Automotive Technical Standards by the UN

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 56 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 December 2022.

The 1998 Agreement aims to harmonize global technical standards, and has been ratified by the EU and 38 countries. There are 23 established Global Technical Regulations (GTRs) as of December 2022. 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: the 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-Signalling (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. The recommended actions for this purpose are promoting multimodal transportation, enhancing road infrastructure, strengthening vehicle safety regulations, cultivating better road user behavior, and improving the rescue of accident victims.

4 Japan

4. 1. General Trends

Table 1 shows the types of automotive legislation (laws

and directives) 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 approximately 100 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 the following four vehicle safety measures: (a) ensure the safety of pedestrians, bicyclists, and other users (b) ensure the safety of vehicle occupants, (c) prevent the serious accidents to prioritize in light of social conditions, and (d) promote the effective and appropriate use of automated driving-related technologies.

(2) Strengthening of Safety Regulations and Harmonization of Criteria

The MLIT is working to incorporate newly established UN regulations in Japanese standards. In 2022, the new UN R161 (Devices for Protection against Unauthorized Use), UN R162 (Immobilizers) and UN R163 (Vehicle Alarm Systems) forming the three parts UN R116 (Anti-theft and Alarm Systems)were brought into the Japanese standards.

The collision mitigation braking system requirements for trucks and buses with a maximum allowable weight exceeding 3.5 tons were strengthened (by adding requirements for pedestrian collisions, for example), and will come into effect in September 2025 for new models, and September 2028 for existing vehicles. At the same time, UN R165 (Audible Reversing Warning Systems), which is intended to prevent accidents involving people with a visual impairment when reversing, has been introduced and will come into effect in January 2025 for new models, and January 2027 for existing vehicles.

(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 Protection

(1) Emissions

In August 2021, UN-R154 World harmonized Light vehicle Test Procedure (WLTP) was established as a domestic standard to achieve harmonization with UN regulations. In addition, the RDE regulation is set to apply to new models from October 2022 and to existing vehicles from October 2024.

The 14th *Future Policy for Vehicle Emission Reduction* submitted to the Minister of the Environment in August 2020 introduced particle number (PN) regulations as a complement to existing regulations on the mass of particulate matter. The PN regulations come into effect in October 2024 for gasoline vehicles and in October 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 strengthening 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, replacing replace the current JC08 test cycle with the WLTC. 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 traveled on electric power on a single charge). The 2030 standard is 44.3% stronger than

the 2020 standard (WLTC fuel consumption conversion). Following the October 2020 declaration of a policy aiming to achieve carbon neutrality by 2050 made by the government, METI set a target of having 100% of new passenger vehicle sales consist of electric powered vehicles (including HEVs) by the mid-2030s in as part of the Green Growth Strategy announced in December 2020. This, in turn, will lead to assessing how to apply fuel economy standards as well as to examining new policies. As part of this assessment, recording and retrieving data such as lifetime/instantaneous fuel consumption values and battery deterioration levels using an on-board fuel and power consumption measuring device (OBFCM) will become mandatory from October 2024 for new models and from October 2026 for existing vehicles.

(3) Noise

The fourth Future Policy for Motor Vehicle Noise Reduction released by the Central Environmental Council of Japan will make the Phase 3 UN R51.03 regulatory values mandatory in October 2024 for new models and in October 2026 for existing vehicles (October 2026 and 2027, respectively for new and existing trucks with a maximum allowable weight exceeding 3.5 tons and new and existing buses with a maximum allowable weight exceeding 5 tons).

4. 4. Other

The revision of the Road Transport Vehicle Act in May 2019 led to the establishment of a system for prior application and confirmation of software update standards compatibility for vehicles in use (the vehicle-specific remodeling permission system), which has been in effect since November 2020. In addition, the automobile inspection system will involve the use of on-board diagnostics (OBD) to inspect carbon monoxide emission prevention devices, driving assistance devices, and automated driving functions starting in October 2024.

5 The U.S. and Canada

5. 1. General Trends

(1) The 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, and 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 the EPA performing the fuel economy calculations. 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 regulations, (b) automobile emissions regulations, (c) regulations on automobile fuel economy, (d) federal noise regulations and, (e) recycling & SOC regulations. The contents of each regulation are 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) Revisions to the passive safety standards (FMVSS) for vehicles without conventional manual control devices in anticipation of Level 3 or higher automated driving:

March 2022

(b) Revisions to the non-binding *Cybersecurity Best Practices for the Safety of Modern Vehicles* guidance: September 2022

5. 3. Environmental Protection

(1) California

Tougher regulations based on the carbon neutrality policy to essentially ban the sale of new vehicles equipped with internal combustion engines—including heavy-duty trucks—by 2035 and achieve net zero carbon emissions for society as a whole by 2045 have been adopted for the 2026 and later model years.

(a) Emissions regulations: The LEV III regulations are currently in effect, and require compliance with the corporate average fuel economy regulations (NMOG + NO_x), which become stricter every year. The PM regulatory value will also be raised to 1 mg/mile as of 2025. Measures to reduce real world emissions, such as a further tightening of corporate average emissions regulations and restrictions on evaporative emissions generated while driving (running loss), as well as making emissions tests stricter, are under discussion for the LEV IV regulations that will apply to the 2026 and subsequent model years. The OBD II regulations have also been amended to include devices such as control monitors under cold engine conditions. For heavy-duty vehicles, emission standards for nitrogen oxides will be gradually strengthened starting with the 2024 model year. The state governor has approved a tightening of the regulations that will ultimately bring the regulatory values to one-tenth of their current level.

(b) Greenhouse gas regulations: In December 2021, under the Biden administration, the NHTSA withdrew the rules issued by former President Trump to rescind California's authority to establish its own regulations. Moving forward, compliance with California-specific 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 rises every year. That mandated proportion has been made even stricter for the 2026 and later model years, with a maximum of 20% for PHEVs and minimum of 80% for EVs and fuel cell vehicles, for a total of 100%, mandated for the 2035 and subsequent model years. The state governor has also approved regulations that make it mandatory for manufacturers to make a fixed proportion of heavy-duty vehicles sold ZEVs starting with the 2024 model year.

(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 lines with those of California. The Tier 4 regulations, which are planned for the 2027 and later model years, are currently being deliberated and may have even stricter content than the LEV IV that will apply in California starting with the 2026 model year. Legislative preparations for new regulations for heavy-duty vehicles primarily informed by the stricter nitrogen oxide regulations introduced by California, as well as for strengthened regulations largely matching that regulatory framework, were completed in December 2022. The regulatory value for nitrogen oxides that will apply starting in the 2027 model year will be 75% lower than the current value.

(b) Fuel economy and greenhouse gas regulations: Under the Trump administration, the EPA and NHTSA relaxed regulations for the 2021 to 2026 model years. Under the Biden administration, the EPA has reinstated the tightening of greenhouse gas regulations for the 2023 to 2026 model years, and is considering a draft for even stricter regulations for the 2027 and later model years. Similarly, NHTSA has brought back stricter fuel economy regulations for the 2024 to 2026 model years, and is expected to strengthen them further for the 2027 and subsequent model years. Tighter greenhouse gas regulations for 2027 and later model year heavy-duty vehicles are under consideration.

(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. When US federal regulations are reviewed, it is expected that the federal government of Canada will also follow suit with stricter regulations.

(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. As with emissions regulations, Canada is expected to follow revisions to the US federal regulations with similar stricter regulations.

(c) ZEV regulations: The federal government of Canada has announced a goal of 100% ZEVs for new vehicles by 2035. The province of Quebec has applied regulations similar to California's ZEV regulations since the 2018 model year, and will review its regulations with an eye to achieving 100% ZEVs by 2035. Similarly, the province of British Columbia has introduced ZEV regulations since the 2020 model year, and announced a regulation proposal to move the initial goal of 100% ZEVs in 2040 forward to 2035.

6 Europe

6. 1. General Trends

(1) EU Whole Vehicle Type Approval (WVTA)

Obtaining 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 WVTA regulation (Regulation (EU) 2018/858) was published in July 2018 and came into effect for new models released in or after 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. Although the EU WVTA provisionally carries over into U.K.-specific approval until January 31, 2024, new models will have to acquire UK-specific approval starting in February 2024. 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 made 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 2022, the new (EU) 2022/545 (Event Data Recorders) was issued, and UN R152 (Light Vehicle AEBS), UN R153 (Fuel System integrity and Electric Power Train Safety at Rear-End Collision), UN R155 (Cybersecurity), UN R156 (Software Updates), UN R157 (Automated Lane-Keeping Systems) and UN R158 (Reversing Motion Detection) were introduced in preparation for bringing them into effect in July 2022.

6. 3. Environmental Protection

Identifying climate change as its highest priority 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_2 reduction target for 2030 from the original 40% compared to 1990 to at least 55%.

A CO_2 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 presented the Fit for 55 package, a comprehensive set of proposed revisions to legislation—including infrastructure and fuel—in line with the European Green Deal. In addition to stricter regulatory values for 2030, proposed legislation to bring CO_2 emissions to zero in and after 2035 is being deliberated in the context of further reducing CO_2 emissions from light-duty vehicles. Heavy-duty vehicle CO_2 (fuel economy) regulations aiming for a reduction of 15% in 2025 and of 30% in 2030 compared to 2019 levels were issued in 2017, and the European Commission is looking into making the regulations even tougher to complement Fit for 55. Regulations to determine CO_2 and fuel consumption using the VECTO tool provided by the Euro-

pean Commission have gradually come into force since 2019 on a per allowable total weight category basis. In 2024, the regulations will start applying to commercial vehicles with an allowable total weight over 5 tons and not exceeding 7.5 tons, as well as to buses exceeding 7.5 tons.

Euro 7 emissions regulations anticipated to apply in 2025 have been proposed. The European Commission views the Euro 7 regulations as the final emissions regulations for internal combustion engine vehicles.

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 before granting a production license.

7. 2. Vehicle 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. The draft guidance on ICV manufacturers and product market entry subjected to a call for comments in April 2021 sets out the requirements for producing and selling ICVs equipped with automated driving functions in China.

A new GB standard on EDRs came into force in January 2022, and new GB/T standards concerning requirements for the ADAS-related technologies of driver monitoring systems and intelligent parking assist systems were issued in 2022. Prior to the GB standardization of cybersecurity, the Ministry of Industry and Information Technology has established reporting requirements concerning OTA updates for completed vehicles produced in China. Since then, more than 20 new items have been formulated for the ADAS technical standards, cybersecurity standards, and automated driving standards.

The Ministry of Transport has issued its own JT/T vehicle safety standards for commercial vehicles in service. 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

A GB standard on brake hose structural performance requirements was issued in August 2022, and a GB standard on indirect vision equipment was issued in December 2022. Various GB standards, including those on road lighting devices, optical signaling devices, retroreflectors, and pedestrian protection are currently being revised.

7. 3. Environmental Protection

(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 officially announced the New Energy Vehicle Industrial Development Plan for 2021 to 2035. The plan includes concrete targets such having NEVs account for around 20% of new vehicles in 2025 and an average electricity consumption of 12.0 kWh/100 km for electric vehicles (EVs).

(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 nationwide 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 standalone 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. Stricter use environment requirements will be implemented in two phases, China 6a and China 6b. Enforcement dates based on usage have been set for gasoline-powered vehicles, city (public) vehicles, and ordinary vehicles, with China 6a coming into effect in July 2021 and China 6b in 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 only involves switching to a converted WLTC fuel economy values without tightening the regulation further. In addition, it was decided to adopt off-cycle credits in CAFC regulations from the fifth stage, and to give preferential treatment 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. A call for comments on a draft proposal concerning rules for 2024 to 2025 was announced in July 2022. The draft not only makes the enforced ratio of NEV credits relative to the production and import of conventional energy vehicles stricter every year, but also proposes a credit pool system for NEV credits. 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

The ASEAN has been discussing the establishment of a Mutual Recognition Agreement (ASEAN MRA) in the automotive field for many years since its heads of state signed the mutual recognition framework agreement in 1998. Approval by all member countries was completed in January 2021, with the application of some items set to start in January 2022. Although none of the countries had actually begun implementing the framework as of the end of 2022, they are working to establish their own domestic legislation, raising expectations for the simplification of approval procedures.

8. 2. India

Over the last few years, India has seen frequent releases of directives to toughen safety regulations, which have been released without coordinating with the Ministry of Road Transport and Highway (MoRTH). This has

made anticipating such directives and keeping up with them difficult for automakers.

One example is the sudden application of high voltage safety requirements for EVs and HEVs from December 2022 to April 2023. A draft notification making seat belt reminder devices mandatory for all seats in passenger vehicles starting in April 2023, and another draft notification to make the installation of six airbags mandatory starting in October 2023, have also been presented. For the latter, there is ongoing coordination with the industry to determine when it will ultimately come into force. Progress is also being made on standards for advanced safety vehicles (ASVs). It will be necessary to keep a close eye on when and how they are applied.

At the same time, the Indian government has a policy to promote alcohol fuel, with the Ministry of Petroleum and Natural Gas (MoPNG) announcing the rollout of E20 fuel over all of India by 2025. The Society of Indian Automobile Manufacturers (SIAM) has also underscored the announcement by committing to making all vehicles E20-compatible by April 2025. This is expected to require measures such as defining certification rules and other matters concerning E20-powered vehicles in the near future. The government's "India First" policy continues to result in the broader adoption of India-specific parts certifications. They cover a wide range of cases, from items directly affecting the vehicle, such as tires, windows, and wheels, to indirectly related items such as sound equipment and digital equipment.

8. 3. Indonesia

The Indonesian government has been promoting the spread of electric vehicles, with new laws and regulations concerning type approval for electric vehicles enacted independently by presidential order. Requirements for EVs have been strengthened with measures 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 adoption of UN regulations for items such as UN R13/13H (Braking), UN R28 (Audible Warning Devices), and UN R29 (Speedometer Equipment) is under consideration in conjunction with the targeted completion of the facility in 2025.

The Euro 4/IV regulations have applied to gasoline vehicles since 2017 and to diesel vehicles since 2022. A tax system based on fuel efficiency started in 2021. Registration requirements for low carbon emission vehicles (LCEVs) eligible for luxury tax rebates under that system have been issued by the Ministry of Industry. For diesel vehicles, B35 biodiesel fuel will apply starting in 2023 with the diesel fuel blended concentration requirement raised to 35%.

8. 4. Thailand

The Department of Land Transport (DLT) has systematically expanded the adoption of UN-R items every year. Most recently, the department decided to adopt UN R100 (Construction and Safety of Electric Powertrains) in 2023, as well as UN R13 and UN R13H (Braking/M1 and N1) in 2024. However, despite having the same technical requirements as the UN regulation, the introduction of adaptations such as instituting Thai-specific plant audit (CoP) requirements make the approval different from that of the UN regulation approval. Conducting tests for UN regulation items such as UN R13/13H (Braking) and UN R14 (Safety-Belt Anchorage) in Thailand will be possible in the future. The Thai Industrial Standard Institute (TISI) is also working with the related ministries to make UN R94 (Occupant Protection in Frontal Collisions) and UN R95 (Occupant Protection in Lateral Collisions) mandatory in 2025.

Following the formulation of national policies to tackle issues such as PM 2.5 and reduce air pollution, the Ministry of Industry (MOI) had pushed for applying Euro 5 to all vehicles in 2021, but an industry proposal to postpone that was accepted by the National Environment Board. Deliberations to apply it starting in 2024 have since been underway, and legislation by the MOI is scheduled to be issued following approval by the National Assembly.

8. 5. Malaysia

A tightening of emissions regulations to Euro 4/IV came into effect in 2020 for gasoline vehicles and 2022 for diesel vehicles. The Euro 5 regulations are also going to be introduced in July 2028 for gasoline vehicles and October 2027 for diesel vehicles. Regulations for diesel vehicles will further go up to Euro 6 in October 2030. Vehicle exterior noise regulations were strengthened to UN R51.02 for light-duty vehicles and UN R51.01 for heavy-duty vehicles on the same timeline as the emissions regulations. Malaysia is the ASEAN country that has adopted the highest number of UN regulations.

8. 6. Vietnam

Emissions regulations were strengthened to Euro 5/V in January 2022. The country has announced a roadmap

(2022 to 2025) to improve road traffic order and safety, as well as a roadmap (2022 to 2050) to transition to green energy and bring greenhouse gas emissions to net zero by 2050.

8.7. Cambodia

In response to the ASEAN MRA trend, Cambodia decided to introduce 16 UN-Rs from 2020 to 2024 for light-duty passenger vehicles and light-duty commercial vehicles. The Euro 4/IV emissions regulations have applied to both gasoline and diesel vehicles since 2022, and are scheduled to be strengthened to Euro 5/V starting in 2027.

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 tests by the nation's own testing institute. The procedure, starting with the examination of the application documents, is carried out extremely strictly. Most recently, for example, the early adoption of side collision warning devices regulations based on UN R151 has come under consideration for heavy-duty vehicles.

The Euro VI emissions regulations have applied to new models since September 2019, and to existing vehicles since September 2020. The application of RDE regulations for gasoline vehicles and of Euro VI-E for heavy-duty vehicles is also being studied. With respect to fuel economy, stronger CAFE regulations will apply in 2022. The sixth-stage noise regulation has been issued and, like the UN R51.03 regulation on vehicle exterior noise used as a model, will be applied in three stages.

8.9. Australia

In terms of safety, a draft of ADR 108/00 on rear visibility and reversing technologies has been issued. The proposed application is March 2024 for new models and March 2026 for existing vehicles, and it is anticipated to adopt the technical requirements found in UN R158. With respect to emissions regulations, the change in government has led to intensifying initiatives targeted at environmental issues. The Australian Department of Climate Change, Energy, the Environment and Water has issued a draft RIS proposal to improve fuel quality, and initiated consultations with stakeholders. If the sulfur and aromatic content in fuel is reduced early, the application of the Euro 6d (WLPT mode) to light-duty vehicles, currently proposed for July 2027 for new models and July 2028 for existing vehicles by government authorities, could be moved up. The new ADR 80/04 based on Euro VI (Stage C) requirements will gradually be introduced for heavy-duty vehicles over one year starting on November 1, 2024.

9 Central and South America

9.1. General Trends

While several countries started producing vehicles in 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 harmonization with those of the UN. Several countries have issued domestic legislation to advance the introduction of safety regulations.

9.2. Mexico

The revised NOM-194-SE 2021 safety regulation was issued. It will gradually make 34 safety systems, including ESC and seat belt reminders, mandatory starting with the 2024 model year. Vehicles must comply with any of the Mexican, U.S., or European regulations. The previously recognized Japanese, South Korean, and Brazilian regulations are no longer accepted.

At the same time, although not mandatory, 21 items—including BAS, LDW, AEB and other advanced safety items, have been defined as optional safety systems. Installing optional systems that meet the requirements incurs the obligation to disclose that information to the public.

9.3. Brazil

The PROCONVE L-7 emissions regulations have applied to all models since January 2022, and the next stage L-8 regulations are scheduled to come into effect in January 2025. 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 were also applied to diesel vehicles in 2022. Currently, regulation values up to 2026 have been decided, and discussions on regulation values for 2027 onward are expected to get underway.

9.4. Argentina

Regulations from the UN, Europe, and the U.S. are all

accepted, and no new regulations have been adopted in the last few years. One distinction, however, is the requirement to present a report in Spanish in certification submissions.

There has been little activity concerning emissions regulations since the application of Euro 5/V in 2015. There has been some indication of starting discussions on Euro 6/IV as the next regulation, but nothing concrete has been set in motion. The fact that, as of the end of 2022, Argentina had no domestic laboratory capable of conducting Euro VI tests is perceived as one of the reasons for the lack of progress of the discussions. With respect to fuel economy and CO_2, 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 efforts to revise GSO regulations have been losing momentum, quiet behind-the-scenes discussions on the mandatory installation of back guide monitors, camera monitor systems (CMS), AEBS, lane-keeping assist (LKA) and other advanced active safety systems are underway. The GSO also issued a directive requiring the UAE to make Euro 6/IV-equivalent exhaust emission regulations mandatory for gasoline and diesel vehicles starting from the 2025 model year. In Saudi Arabia and Qatar, 2024 model year diesel vehicles are now subject to the Euro 5 regulations. Although work on preparing GSO regulations for EVs is underway, there are no plans to include them in the list of GSO applied regulations. Nevertheless, Oman and Bahrain require obtaining GSO certification for EVs, and Saudi Arabia and the UAE each have their own specific regulations.

10. 2. South Africa

A revision to the UN regulations-based VC8022 regulations coming into effect on January 1, 2026 has been announced. It covers items such as mandating the installation of an ESC system and airbags for all seats, rear end collisions, and cybersecurity for connected vehicles. The Euro 5a emissions regulations will apply as of September 1, 2023, and the Euro 5b regulations as of September 1, 2025.

11 Motorcycles

11. 1. Japan

(1) Vehicle Safety

The Installation of Lighting and Light-signalling Devices (UN R53/03) regulation will apply to new models other than class 1 motor-driven cycles starting in September 2023, and to new class 1 motor-driven cycle models, including the L1 category, as of June 15, 2025. No deadline has been set for existing vehicles. However, vehicles must be equipped with side marker lamps (front position lamps) and side reflectors, and provisions allowing the installation of daytime running lamps (DRL), automatic high beams (AHB), and adaptive driving beams (ADB) have been added.

Reflecting amendments to Motorcycle and Moped Braking (UN R78) with respect to advanced brakes, the installation of ABS in vehicles with a displacement exceeding 125 cc and either ABS or a combined brake system (CBS) in vehicles with a displacement exceeding 50 cc but less than 125 cc became mandatory starting in October 2018 for new models, and October 2021 for existing or imported vehicles.

The UN regulation governing battery electric motorcycles (UN R136/00) is already in effect, and the addition of vibration and impact tests for removable batteries, water spraying tests, and tell-tale requirements in the UN R136/01 revision will apply as of September 2025 for new models and September 2027 for existing vehicles.

(2) Emissions

The fourth emissions regulations based on GTR2 exclude the class 0 WMTC mode that extends the motorcycle mode, including evaporation requirements (1.5 g/test) and J-OBD II requirements (OTL1), came into effect for new models on December 1, 2020, and for existing motorcycles other than class 1 motor-driven cycles starting in November 2022. Application to class 1 motor-driven cycles will being in November 2025. The catalyst

monitor component of the J-OBD II requirements (OTL2) will apply to the new mini-sized and light-duty motorcycles models from December 2024, and to existing mini-sized and light-duty motorcycles from November 2026. However, application to new models of mini-sized and light motorcycles in the class 2 motor-driven cycle category will apply one year later, starting in December 2025 for new models and December 2027 for existing vehicles. The class 1 motor-driven cycle category is unique to Japan and not conceptually dependent on the GTR. Consequently, the J-OBD II requirements (both OTL1 and OTL2) do not apply, and only the J-OBD I requirements are in effect. Similarly, class 2 motor-driven cycles are also exempt from the catalyst degradation monitor requirements because alternative standards have been accepted for light-duty and mini-sized motorcycles.

On-board fuel consumption monitoring (OBFCM) will apply to type designated vehicles starting in October 2026 for new models and October 2029 for existing vehicles.

(3) Noise

Noise regulations (UN R41/04) for L3 category motorcycles have applied to new models since January 2014, and to existing vehicles since January 2017. Additionally, the revision to UN R41/05, which includes additional noise regulations such as ASEP 2.0, will apply to new models starting in September 2023 and to existing vehicles starting in September 2024.

11. 2. U.S.

(1) Vehicle Safety

There were no significant changes to the laws or regulations.

(2) Environmental Protection

The state of California is considering amendments that will bring emissions regulations up to the Euro 5 level and be introduced with the 2026 model year. The addition of California-specific requirements (evaporative emissions, OBD II, and other requirements) is anticipated starting with the 2028 model year.

11. 3. Canada

There were no significant changes to 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 has been in effect since 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).

The withdrawal of the U.K. from the European Union automatically made receiving European WVTA impossible as of January 2021 and requires obtaining the U.K. type approval, which is based on the European WVTA. The U.K. Vehicle Certification Agency (VCA) is continuing to assess ways of obtaining formal type approval.

(1) Vehicle Safety

Motorcycles continue to be exempt from the cybersecurity and cybersecurity management system regulation (UN R155). However, compliance with the Cyber Resilience Act, which applies to all products containing digital elements in Europe, is anticipated to be required.

(2) Emissions

In accordance with the delegated regulation ((EU) 2019/129), Euro 5 has applied to new models since January 2020 and to existing vehicles since 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 revised UN R41/05 (RD-ASEP) regulation, which amends the current UN R41/04 motorcycle noise regulation quoted in the European WVTA to include the Additional Sound Emission Provisions (ASEP) has been issued. It is scheduled to apply to new models in September 2023, but synchronizing them with the Euro 5+ emissions regulations is under consideration.

11. 5. China

In terms of safety, the passenger handholds and foot rest regulations have been revised. They came into effect for new models in January 2022, and will apply to existing vehicles as of January 2024. Revisions to regulations such as those on lighting devices (GB 18100), anti-theft devices (GB 17353), and brakes (GB 20073) are under consideration.

On the environmental front, the China IV (equivalent to Euro 4) emissions regulations are currently in effect, and the next-stage China V (equivalent to Euro 5, with

additional China-specific requirements) are under assessment. Noise regulations equivalent to UN R41/04 are under assessment, and are also anticipated to include additional China-specific requirements.

11. 6. Asia & Oceania

(1) India

Safety-wise, the Bureau of Indian Standards (BIS) part certification for wheel rims has been in effect since September 2022.

In terms of the environment, the Bharat Stage (BS) VI Euro 5-equivalent emissions regulations are currently in effect. The OBD Stage II-A regulations, minus the catalyst degradation monitor and in-use performance ratio (IUPR) regulatory values (with monitoring carried out), will apply in April 2023, while the OBD Stage II-B with the catalyst degradation monitor and IUPR regulatory values will come into effect in April 2025. The IS 3028 noise regulations (equivalent to UN R41.04) will come into effect on August 6, 2023.

(2) Indonesia

The application of emissions regulations equivalent to Euro 4 (Types 1 &2 only) is under consideration. A noise regulation (UN R41/04) has been in effect for new models since October 23, 2021, and will apply to existing vehicles as of October 23, 2023. However, factors such as the status of facility completion will result in some differences in administrating the regulation.

(3) Thailand

In terms of safety, brake regulations (equivalent to UN R78/04) came into effect in January 2022 for new models, and will apply to existing vehicles starting in January 2024. In addition, advanced braking (ABS/CBS) will become mandatory in January 2024 for new models and in January 2026 for existing vehicles. A regulation on the installation of lighting devices (equivalent to UN R53/01) will come into effect for new models in January 2024. Applying regulations for speedometers (equivalent to UN R39/01) and controls/tell-tales (equivalent to UN R60/00), as well as a consolidated regulation on vehicle approvals involving electromagnetic compatibility (UN R10/05), to new models is under consideration. With respect to the environment, seventh stage emissions regulations equivalent to Euro 4 (applying to everything except OBD) have been in effect since March 2020. A noise regulation equivalent to UN R41/04 came into force for new models in January 2022, and will apply to existing vehicles in January 2024.

(4) Malaysia

On the safety front, making ABS/CBS mandatory starting in January 2025 is under consideration. Since January 2022, the new lighting device regulations (UN R148, UN R149, and UN R150) can be applied as alternative regulations.

The Euro 4 (Types 1 & 2 only) emissions regulations have been in force since January 2020 for new models, and will apply to existing vehicles as of January 2023. Noise regulations (UN R41.05) have applied to new models since January 2020 and to existing vehicles since January 2023.

(5) Vietnam

Revisions to wheel regulations are under consideration.

In terms of the environment, a strengthening of the emissions regulations based on Euro 4 is being assessed. Fuel economy regulations are also being examined.

(6) The Philippines

The Philippines is assessing the incorporation of horn (UN-R28/00), tire (UN-R75/00), and speedometer (UN-R39/01) safety regulations. The adoption of certification for standalone parts such as lighting devices (UN R3, UN R50, UN R112, and UN R113) and mirrors (UN R81) is also under assessment. Euro 3-equivalent emissions regulations are currently in effect, and initiatives for a Euro 4 (Types 1 & 2 only)-equivalent for the environment, and the UN R41/03 for noise, are being considered.

(7) Taiwan

Safety regulations matching those of Europe have made ABS or CBS mandatory since January 2019 for new models only. The seventh stage emissions regulations (equivalent to Euro 5, with Taiwan-specific requirements) have applied to new models since January 2020, and to existing vehicles since January 2022. Revised fuel economy regulations have also been in force since January 2022. The sixth stage noise regulations (equivalent to UN R41.04, with Taiwan-specific regulatory values applied to close proximity exhaust noise) are in effect.

(8) Australia

The new *Road Vehicle Standards Act* (RVSA) has been issued, and came into effect in July 2021.

The mandatory installation of front and rear ABS for vehicles with a displacement of 125 cc or higher, and of either ABS or CBS in the front and rear for smaller vehicles, came into effect in November 2019 for new models and in November 2021 for existing vehicles. There are currently no significant changes to regulations in other

categories, including the environment.

11. 7. Central and South America

(1) Brazil

Safety regulations making ABS or CBS mandatory for vehicles with a displacement below 300 cc (output below 22 kW), and ABS for those with a displacement of 300 cc or higher (22 kW or more), came into effect in 2019. UN regulations on lighting devices and mirrors were used as a basis to amend domestic laws, which have applied to production vehicles and to vehicles clearing customs since January 2019. UN regulations on audible warning devices and electric safety were used as a basis to amend domestic laws, which have applied to production vehicles and to vehicles clearing customs since January 2022. Legislation on external projections and passenger handholds is under consideration. The PROMOT M5 (e.g., stricter regulation values, extended durability distance, the addition of evaporative emissions diurnal testing, aldehydes, and the addition of OBD (M1) requirements) will apply to new models as of January 2023 and to existing vehicles starting in January 2025. The enforcement of OBD (M2) will begin in January 2025 for new models, and January 2027 for existing vehicles.

(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 were applied to new models from June 2021 and will apply to existing motorcycles from January 2023. The mandatory installation of ABS on motorcycles with a displacement of over 250 cc, and of ABS or CBS on motorcycles with a displacement exceeding 50 cc and no higher than 250 cc, starting in January 2024 for new models and January 2026 for existing motorcycles is under consideration.

(3) Peru

The Euro 3 emissions regulations have been in effect since January 2017.

(4) Chile

In terms of safety, the installation of advanced brakes (ABS or CBS) for motorcycles has gradually become mandatory since February 2022. Passenger handholds, mirrors, fuel tanks, controls/tell-tales and other components must comply with one of the U.S., European WVTA, or Chinese GB regulations. Since March 2019, the Euro 3 have become the only emissions regulations in effect. Noise regulations equivalent to UN R41.03 have applied since July 2019.

(5) Columbia

Safety regulations mandating the installation of advanced brakes (ABS or CBS) will come into effect in October 2025. Regulations issued in September 2019 have brought Euro 3-equivalent emissions regulations into force since January 2021 for vehicles produced domestically or clearing customs.

11. 8. Middle-East

Gulf Cooperation Council (GCC)

Environment and safety-related laws and regulations are currently in effect, and the vehicle categories in the vehicle certification system for motorcycles have followed European standards since January 2020.