Chapter 1

Inland ASEAN Road Connectivity: Challenges and Prospects

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Chapter 1

Inland ASEAN Road Connectivity: Challenges and Prospects

Masami Ishida

This chapter presents the background of the research project entitled 'New Developments for Cross-border Transport Facilitation in the Inland ASEAN and Establishment of the AEC'. It first reviews the history of the ASEAN Highway and Master Plan on ASEAN Connectivity. Subsequently, it looks at the state of the identified road projects due for an upgrade in Lao PDR and Myanmar. This study also examines the economic impact of newly developed roads, including an expressway in Cambodia and in Viet Nam. Moreover, it summarises the regulations on technical standards and road signs, and laws on transport or traffic in Cambodia, Lao PDR, Myanmar, and Viet Nam. Finally, it reviews the results of this chapter and introduces the coverage of subsequent chapters.

Introduction

The year 2015 was a great milestone for the ASEAN with the establishment of the ASEAN Economic Community (AEC). There, too, was the release of the Master Plan on ASEAN Connectivity (MPAC), a set of strategic documents that details how to achieve overall ASEAN connectivity and identifies projects that need to be immediately implemented for the period 2011–2015. This master plan aims to connect the ASEAN through enhanced physical infrastructure development (physical connectivity), effective institutions, mechanisms and processes (institutional connectivity), and empowered people (people-to-people connectivity).

The first purpose of the research project of the Economic Research Institute for ASEAN and East Asia (ERIA) and the Institute of Developing Economies, Japan External Trade Organization's (IDE–JETRO) entitled, "New Developments for Cross-border Transport Facilitation in the Inland ASEAN and Establishment of the ASEAN Economic Community" is to review the efforts in the MPAC. Chapter 2 presents the transport facilitation undertaken in Inland ASEAN including

ASEAN Framework Agreement on the facilitation of Goods in Transit (AFAFGIT) and Cross-Border Transport Agreement (CBTA) under the scheme of Greater Mekong Subregion (GMS) Economic Cooperation Program. Chapters 4 and 5 analyse Lao PDR and Myanmar's efforts to eliminate missing road links and to upgrade certain roads to the Class III level. On the other hand, Chapters 3 and 6 look at some roads that have been upgraded recently in Cambodia and in Viet Nam, although these improvement initiatives were not listed in the MPAC.

Section 1 of this first chapter summarises the road infrastructure efforts of Cambodia, Lao PDR, Myanmar, and Viet Nam (altogether referred to here as the CLMV) and the effects of the road enhancements as estimated by the simulation study in Chapter 7.

Part of the most important challenges of the AEC and MPAC is how these will simplify the various procedures and harmonise rules at border checkpoints. For instance, in Inland ASEAN – which is composed of Cambodia, Lao PDR, Myanmar, Thailand, and Viet Nam – efforts are already being made to facilitate cross-border movement of vehicles and align transport rules.

Efforts conducted under the scheme of ASEAN are represented by the transport-related ASEAN framework agreements that cover the 10 ASEAN countries, while the scheme under the Economic Cooperation Program of Greater Mekong Subregion has the CBTA, which covers the Yunnan Province and Guangxi Zhuang Autonomous Region in China, in addition to the five countries mentioned above. The CBTA annexes and protocols were ratified by all countries in 2015, which then paved the way for cross-border movements of vehicles to be accelerated in the Inland ASEAN (As discussed in Chapter 2).

With the ratification, cross-border land transport is estimated to increase in the coming years. Without the harmonisation of transport rules, however, drivers might face difficulties in their destination territories (e.g., struggles with unfamiliar traffic signs). Thus, the second purpose of this project is to examine the current status of the harmonisation efforts on technical standards such as the width, height, length of vehicles, maximum weight of vehicles, traffic signs, and related traffic or transport laws in Cambodia, Lao PDR, Myanmar, and Viet Nam (Chapters 3 through 6).

To provide the context for the per-country discussion, Chapter 1 reviews the history of the ASEAN Highway and MPAC. The first section looks at the challenges of the MPAC in Lao PDR and Myanmar as well examines the improvements on road infrastructure and their economic

benefits to Cambodia and Viet Nam. Sections 2 through 4 summarise the technical standards, road traffic signs, and transport-related laws in CLMV, respectively. This chapter concludes by introducing the succeeding chapters.

1. Elimination of Missing Road Links; Upgrade of Roads

1.1. ASEAN Highway

The ASEAN Transport Ministers (ATM) Meeting was launched on 18 March 1996 in Bali, Indonesia. The Second ATM Meeting, which was held in Chiang Mai, Thailand on 28 February 1997 succeeded to solicit participating nations' agreement to 'develop a complete system of highway network to link ASEAN member countries together and where technical standards of design and road traffic safety are compatible'. At the Third ATM Meeting at Cebu, Philippines on 5 September 1997, it was agreed that 'Thailand convene the meeting of ASEAN Highway Experts to follow-up the proposed development of the ASEAN Highway Network Project as the country coordinator'.

The coordinated results were brought to the Second Unofficial Summit in Kuala Lumpur on 15 December 1997, and the development of an integrated and harmonised trans-ASEAN transportation network was stipulated in the ASEAN Vision 2020. As a result, the Ministerial Understanding on the Development of the ASEAN Highway Network Project was agreed to be adopted during the Fifth ATM Meeting in Hanoi, Viet Nam on 15–16 September 1999 (Ishida, 2015; ASEAN Secretariat, 1999; ASEAN Secretariat, 1997).

The ministerial understanding's objectives are:

1) To provide an institutional mechanism to formalise the strategic route configuration and the uniform technical design standards of the ASEAN Highway Network;
2) To formulate the ASEAN Highway Infrastructure Development Plan;
3) To promote cooperation with other international and regional organisations so as to ensure technical compatibility of ASEAN's road standards and road safety requirements, and create stronger links and connection within ASEAN and with neighbouring or adjoining regions;

4) To intensify cooperation in the facilitation of international road traffic throughout the ASEAN region.

Annex B of the ministerial understanding classifies the highways into four classes, as shown in Table 1.1. Article 3 of the understanding requests the ASEAN member countries to improve or upgrade the designated national sections of the ASEAN Highway Network in line with the phased development timeframe, as shown in Table 1.2.

Table 1.1. Road Classification of ASEAN Highway

	Description	**Pavement Type**	**Designated Speed**
Primary	Access controlled motor way with four or more lanes	Asphalt or cement concrete	60–120 km/h
Class I	Four or more lanes	Asphalt or cement concrete	50–110 km/h
Class II	Two lanes	Asphalt or cement concrete	40–100 km/h
Class III	Two lanes	Double bituminous treatment	40– 80 km/h

Note: Desired speed is differently stipulated by geographical conditions: level terrain (L), rolling terrain (R), and mountainous terrain (M).
Source: ASEAN Secretariat (1999).

Table 1.2. Original Development Targets for ASEAN Highway Network

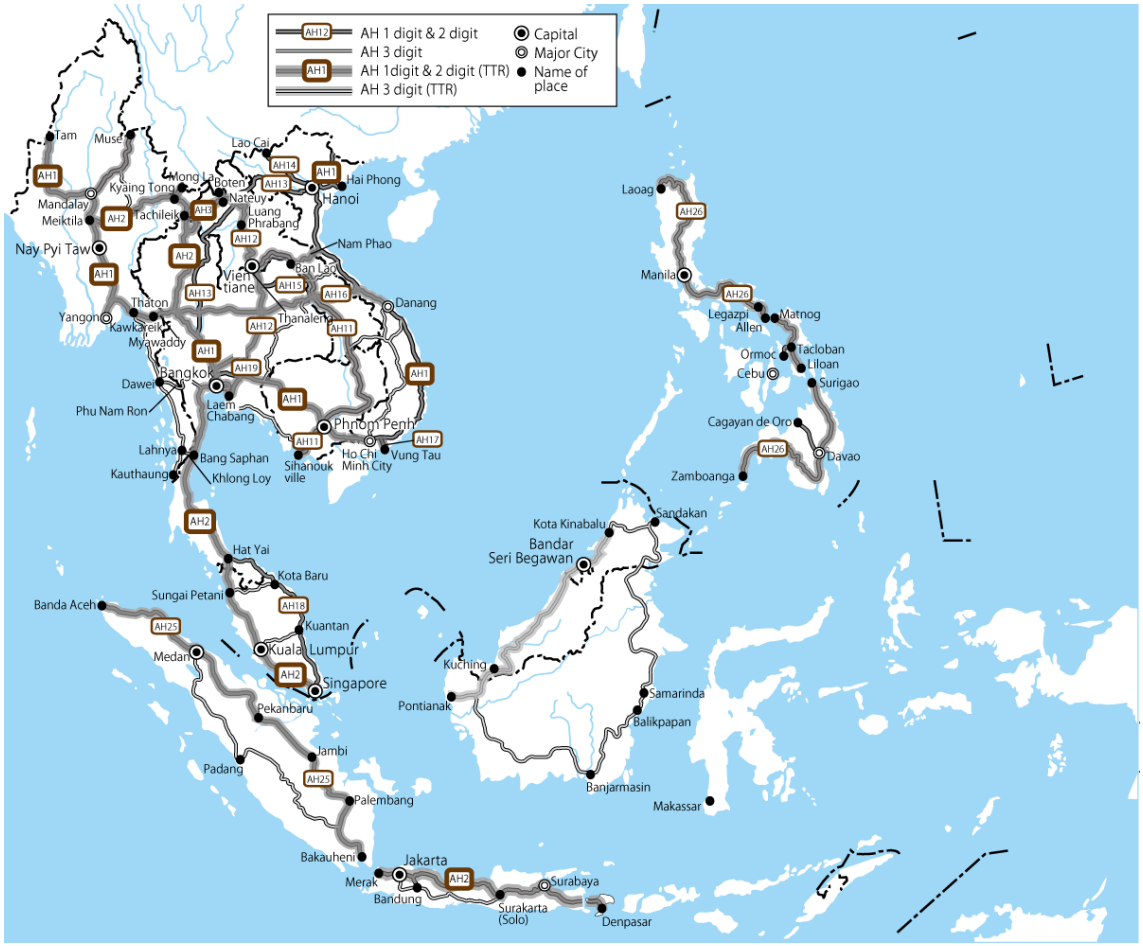
Phase	**Tentative Completion Year**	**Technical Requirements**
Stage 1	2000	Completion of network configuration and designation of national routes
Stage 2	2004	Road signs and all designated routes upgraded to at least Class III
Stage 3	2020	All designated routes upgraded to at least Class I or Primary Class

Source: ASEAN Secretariat (1999).

Annex A of the ministerial understanding shows the designated concrete highways from ASEAN Highway 1 (AH1) to AH16 with a total length of 38,400 km (ASEAN Secretariat, 1999).

The highways are designated according to the Trans-Asian Highway Network by the United Nations Economic Social Commissions for the Asia–Pacific Region, although the designated numbers and routes are slightly different. However, after the signing of Protocol 1 of the ASEAN Framework Agreement for Facilitation Goods in Transit (AFAFGIT) on 16 December 1998, the ASEAN highways have been following the numbers and routes of the Trans-Asian Highway (Ishida, 2015) as indicated in the MPAC, while the map in the MPAC was originally created by JETRO (2008) (Figure 1.1). The Transit Transport Route in Figure 1.1 is designated in Protocol 1 of the AFAFGIT that was signed on 8 February 2007 and has a total length of 21,206 km.

Figure 1.1. Routes of the ASEAN Highway



Source: Created by the author based on JETRO (2008) and Hayashi (2004).

1.2 Master Plan on ASEAN Connectivity

The ASEAN connectivity started as a concept discussed at the 15th ASEAN Summit in Cha-am, Hua Hin, Thailand on 24 October 2009. At the 17th ASEAN Summit in Hanoi, Viet Nam on 10 October 2010, the MPAC, which was developed by the High-Level Task Force on ASEAN Connectivity, was adopted.

The scope of MPAC is broad, covering not only physical connectivity such as transport, information and communication technology, and energy, but also institutional connectivity and people-to-people connectivity. The ASEAN Highway Network is one of the most important parts of the MPAC.

The MPAC covers Article 3 of the Ministerial Understanding on the Development of the ASEAN Highway Network Project in 1999 and the Transit Transport Routes, but recognises that its implementation of the ministerial understanding is behind schedule. In particular, the MPAC clarifies that the total length of 227 km of missing road links in Myanmar and 2,069 km of Transit Transport Routes in Lao PDR and Myanmar are classified as below Class III roads (Table 1.3). The situation of these roads as of 2012 is shown in Table 1.4.

Table 1.3. Missing Road Links and Below-Class III Road Sections Needing Upgrade Based on the MPAC

'Missing Links' As Designated in the MPAC.

AH No.	**National Road**	**Section**	**Distance**
AH112	Myanmar No. 8	**Lahnya–Khlong Loy**	60 km
AH123	Myanmar	**Dawei–Maesamepass (Phu Nam Ron)**	141 km

Sections to Be Upgraded to Class III.

AH No.	National Road	Section	Distance
AH12	Lao PDR No. 13	**Vientiane–Luang Prabang**	393 km
AH15	Lao PDR No. 8	**Ban Lao–Namphao**	98 km
AH1	Myanmar No. 1 & No. 8	**Tamu–Mandalay–Bago–Myawaddy**	781 km
AH2	Myanmar No. 4	**Meiktila–Loilem–Kyaing Tong–Tachileik**	593 km
AH3	Myanmar	**Kyaing Tong–Mong La**	93 km

Source: P74, ASEAN Connectivity Master Plan (MPAC).

Table 1.4. State of Road Sections as of 2012

State of Sections Categorised as 'Missing Links'.

AH No.	National Road	Section	Distance	Road Class
AH1	Myanmar	Tamu–Mandalay	610 km	3 or Below 3
AH1	Myanmar	Thaton–Myawaddy	195 km	3 or Below 3
AH2	Myanmar	Meiktila–Loilem	276 km	2, 3 or Below 3
AH2	Myanmar	Loilem–Kyaingtong	367 km	Below 3
AH111	Myanmar	Thibaw–Loilem	239 km	
AH112	Myanmar	Mawlamyaine–Thanbyuzayat	64 km	2 or Below 3
AH112	Myanmar	Thanbyuzayat–Lahnya	695 km	Below 3
AH112	Myanmar	Lahnya–Khamaukgyi	260 km	Missing Link
AH123	Myanmar	Dawei–Phu Nam Ron	150 km	Missing Link

Situations of Sections to Be Upgraded to Class III.

AH No.	National Road	Section	Distance	Road Class
AH13	Lao PDR No. 13S	Vientiane–Nong Nokkhien	861 km	3 (completed)
AH12	Lao PDR No. 13N	Thanaleng–Nateuy	682 km	3 (completed)
AH15	Lao PDR No. 8	Banlao–Nam Phao	132 km	3 (65% completed)
AH3	Lao PDR No. 3	Houayxay–Boten	251 km	3 (65% completed)
AH16	Lao PDR No. 9	Seno–Dansavanh	240 km	3 (completed)
AH13	Lao PDR No. 2	Oudomxay – Tay Trang (V)	202 km	Need funding

Source: Based on ASEAN Connectivity Master Plan Information Sheet, 2012.

Amongst the roads in Table 1.3, the author has examined AH112, AH12 (or National Road [NR] No. 13) in Lao PDR, AH15 (or NR No. 8) in Lao PDR, and AH1 (or NR No. 8) in Myanmar.

In particular, the section between Phonhong and Phou Khoun of AH12 was examined twice: on 24 July 2011 and 8 November 2015. According to Table 1.3, the section was classified as below Class III in 2010, and the upgrade to Class III was completed in 2012. In reality, the road condition was not below Class III in 2011. In 2015, on the other hand, no 'upgrade' was noticed since 2011. In fact, the condition of a section was worse than it was in 2011. As such, it was difficult to assess whether the section between Vientiane and Luang Prabang needs to be designated as 'to be upgraded to Class III'.

It is likewise difficult to establish whether the correct recognition of the real road conditions was shared amongst government officials (at both provincial and national levels), as this requires multiple viewings. Additionally, for roads in mountainous sections, there is a need to decide whether it is realistic to upgrade them to at least Class III. After all, it is more difficult to maintain the Class III condition in mountainous sections, where landslides and rock falls occur during the rainy season (Figure 1.2).

Meanwhile, in AH1 (or NR No. 8) in Myanmar, the section between Myawaddy (a border city of Myanmar with Thailand) and Yangon was evaluated by the author twice (i.e., on 1–3 December 2013 and on 27 January 2016).

The section between Thaton and Myawaddy was classified as 'Class III or below Class III' as of 2012. The evaluation was correct when the section between Thingan–Nyinaung and Kawkareik used to be one way (i.e., only automobiles from Thingan–Nyinaung to Kawkareik could pass on one day; the next day, only the automobiles from the other direction could pass).

Figure 1.2. Rock Falls and Landslides in a Section of AH12

Source: Taken by the author on 24 July 2011.

Source: Taken by the author on 8 November 2015.

Figure 1.3. Before and After the Road Upgrade at Y-Junction

Source: Taken by the author on 1 December 2013.

Source: Taken by the author on 27 January 2016.

On 30 August 2015, a new Class II road was developed with assistance from the Thai government (Figure 1.3). The new road section measures 44 km – or 21 km shorter than the older one. One can traverse this upgraded section within one hour only as compared to the four hours in 2013.

Figure 1.4. A Shopping Mall in Mae Sot with Signs in the Burmese Language

Source: Taken by the author on 26 January 2016.

With the completion of the project, the number of Myanmar visitors who enjoy shopping at Mae Sot has increased. In this border town of Thailand,[1] one shopping centre even welcome

[1] An interview at Tak Chamber of Commerce at Mae Sot.

customers from Myanmar in the Burmese language (Figure 1.4). However, the economic impact of the new road in Tak Province, which includes Mae Sot, is not substantial, according to the simulation results in Chapter 7 of this report.

1.3 Other Road Improvements

Certain roads have been improved although their upgrade was not listed in the MPAC. Amongst these are projects along the designated economic corridors under the Greater Mekong Subregion Economic Cooperation Programme. This section thus presents road improvement cases specifically in Cambodia and Viet Nam.

In Viet Nam, a bridge over Cai Lon River, 22 km away from Rach Gia, in Kieng Giang Province, was formally opened on 7 February 2014. With its completion, the Southern Coastal Sub-Corridor of the Southern Economic Corridor can now be traversed without the need for ferryboats. Meanwhile, the bridge over the Mekong River at Sutung Treng, Cambodia along the northern subsection of the Southern Economic Corridor was completed in 2014 with assistance from China and opened on 1 April 2015.

The NR No. 9 between Cambodia's Soutr Nikom and Stung Treng (273 km) is a newly developed section, which includes the Stung Treng Bridge. When the author passed through the section on 4–5 November in 2015, he found the road to be in good condition, although the number of cars passing through was limited. The simulation analysis (See Chapter 7) also shows that the impact of the road improvements on both Siem Reap and Preah Vihear Provinces – areas of the road network the author passed by – are smaller than the overall improvement on NR No. 9.

Another bridge over the Mekong River called the Tsubasa Bridge at Neak Loeung, Cambodia (along the central subsection of the Southern Economic Corridor) was completed through a grant from the government of Japan and opened on 6 April 2015.

In Viet Nam, new by-pass roads have been developed mainly along NR No. 1 through the Build-Operate-Transfer scheme. There are also several recently completed expressways such as those between:

- Lang and Hoa Lac (3 October 2010)
- Cau Gie and Ninh Binh (30 June 2012)

- Ha Noi and Thai Nguyen (13 July 2013);
- Ho Chi Minh City and Long Thanh (29 August 2014);
- Long Thanh and Dau Giay (8 February 2015);
- Noi Bai and Lao Cai (21 September 2014); and
- Ha Noi and Hai Phong (5 December 2015).

Of the above areas, the author passed through the Noi Bai–Lao Cai Expressway on 21 January 2015 and noted that road improvements had substantial effects on the communities. First, industrial estates developed around interchanges of the expressway attracted more foreign investment into Phu Tho and Yen Bai Provinces in 2015. In particular, the impact on Phu Tho Province was substantial – a conclusion supported by the simulation analysis in Chapter 7.

Second, the marketing area for agricultural products has expanded while transport time was reduced.

Third, the number of domestic tourists who are using their own cars to travel from Ha Noi to Sa Pa has dramatically increased. Today, travel time by car takes four hours, whereas the only means of transport to Sa Pa used to be the night trains. With the increase in tourism, the supply of hotels and parking spaces could not meet the increasing demand.

Finally, there are now lesser overloaded trucks. In the past, drivers are given incentives to carry more goods in one trip so as to reduce the transport cost per weight. Today, following the completion of the expressway, transport time has reduced, thereby lessening the need to incentivise drivers to bring in as much goods in one trip as possible.[2]

2. Comparing Technical Standards

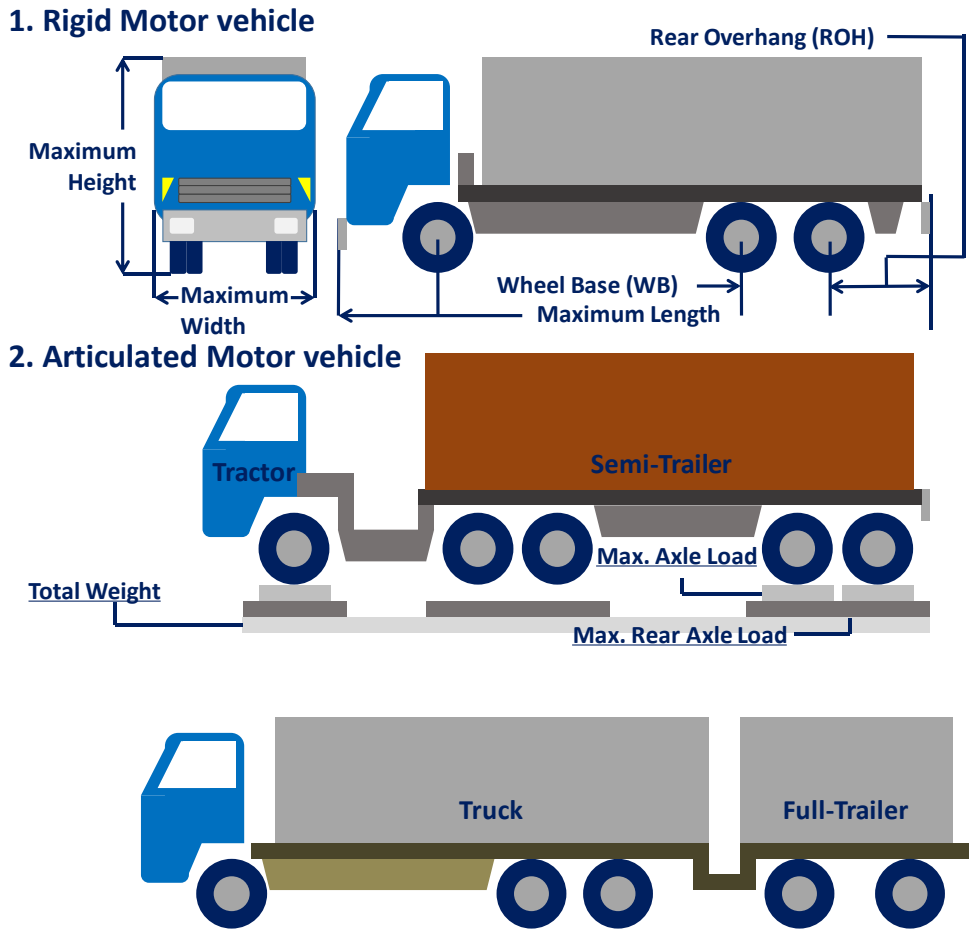
The technical standards on road transport stipulate the maximum values on such factors as length, width, height (Figure 1.5), and weight. The maximum length and weight are regulated differently by types of vehicle, such as a truck or a rigid motor vehicle and an articulated vehicle. The articulated vehicle is divided into tractor (motor vehicle) and trailer. A semi-trailer is a trailer without (a) front wheel(s) such as vehicle No. 2 in Figure 1.5, and the tractor for the

[2] This information is based on interviews with the people's committee of Yen Bai and Phu Tho on 21 January 2016 and of Lao Cai Province on 22 January 2016.

semi-trailer does not have its own bed. A full-trailer is a trailer with (a) front wheel(s), and the tractor or truck has its own bed, such as the vehicle in the last row below. *Wheel base* is the length between the centre of the front wheel and that of the rear wheel. The *rear overhang* is the length between the centre of the rear wheel and the rear edge of the truck or the trailer.

As far as the weight is concerned, the burden on roads can be reduced when there is an increase in the number of axles and wheels. The longer the length between two axles, the smaller the burden on the road. The single axle load is a load per axle. The maximum rear axle load might be expressed in the length between the wheel base and the rear overhang. The way to regulate the axle loads is different by country. For example, in Viet Nam, the maximum axle load is regulated by the number of axles, the length between the twin or triple axles, and the dimension (Chapter 6). In Cambodia, the number of wheels is considered regardless of the length between the axles (Chapter 3).

Figure 1.5. Rigid Motor Vehicle and Articulated Motor Vehicle



Source: Created by the author.

The fundamental rules on the technical requirements are stipulated in the annexes of AFAFGIT's Protocol 4. Table 1.5 shows the mandatedmaximum values such as weight, height, and width. Maximum lengths and widths for rigid vehicles are the same between CLMV's standards and those stipulated in the AFAFGIT.

Meanwhile, the underscored maximum lengths and heights for articulated vehicles in Table 1.5 have values higher than the AFAFGIT standards. This means that articulated vehicles registered under these countries (i.e., Cambodia and Lao PDR) are not guaranteed to be allowed to ply in other ASEAN countries.

Table 1.5. Technical Standards Stipulated in CLMV and in the AFAFGIT (metre)

	Cambodia	**Lao PDR**	**Myanmar**	**Viet Nam**	**AFAFGIT**
Maximum Length					
(Rigid Motor Vehicle)	12.2	12.2	12.2	20	12.2
(Articulated Vehicle)	18.0	19.0	15.2		16.0
Maximum Width	2.5	2.5	2.5	2.5	2.5
Maximum Height	4.2	4.5	4.6	4.2	4.2
Maximum Number of Axles	5	6	6	No Restriction	
Maximum Axle Load	10.0	No Restriction		10.0	
Maximum Rear Axle Road	19.0	ROH < 60% of WB	ROH < 60% of WB	18.0	ROH < 60% of WB

AFAFGIT= ASEAN Framework Agreement for Facilitation Goods in Transit; ROH = rear overhang; WB = wheel base

Notes: 1) the maximum width of vehicles equipped with tools shall not be more than three metres, the maximum length of the automobiles towing semi-trailers shall not exceed 16 metres in Cambodia.

2) The maximum height on the expressway or Class I –III highways is 4.75 metre in Viet Nam.

Source: Based on chapters 3–6 of this publication.

Table 1.6 shows the technical standards on weight stipulated in CLMV and in the AFAFGIT. In many cases, the maximum weights permitted in CLMV are higher than the standard of the AFAFGIT. In particular, the maximum weight in Lao PDR seems to be higher than that of the other countries.

Table 1.6. Technical Standards on Weights in CLMV and in the AFAFGIT

	Cambodia	Lao PDR	Myanmar	Viet Nam	AFAFGIT
3-axle Rigid Vehicle	25.0	25.0	21.0	24.0	21.0
4-axle Rigid Vehicle	30.0	29.5	25.0	30.0	25.0
4-axle Articulated Vehicle	35.0	36.0	31.0	34.0	32.0
5-axle Articulated Vehicle	40.0	45.0	45.0	38.0–42.0	36.0
6-axle Articulated Vehicle	Permission	49.6	48.0	40.0–48.0	38.0

AFAFGIT= ASEAN Framework Agreement for Facilitation Goods in Transit.
Notes: In Cambodia, use of vehicles with more than five axles requires a permission letter from the Ministry of Public Works and Transport.
Source: Based on Chapters 3–6.

Figure 1.6 shows road signs with the required weight limit before approaching a small bridge. Vietnamese border officials recently set the weight limit to prevent damage to the road's surface. Thus, at Lao Bao, a border city of Viet Nam with Lao PDR along the East–West Economic Corridor, cargoes coming from a Lao truck have to be unloaded and then reloaded onto two trucks before entering Viet Nam. However, it is highly possible that overloading do occur in some cases despite the presence of these road signs along the borders if the government of Lao PDR does not check vehicles' weight rigidly.

Figure 1.6. Road Signs on the Maximum Weight in Lao PDR and Cambodia

Lao PDR

Source: Taken by the author on 8 November 2015.

Cambodia

Source: Taken by the author on 6 November 2015.

3. Comparing Road Signs

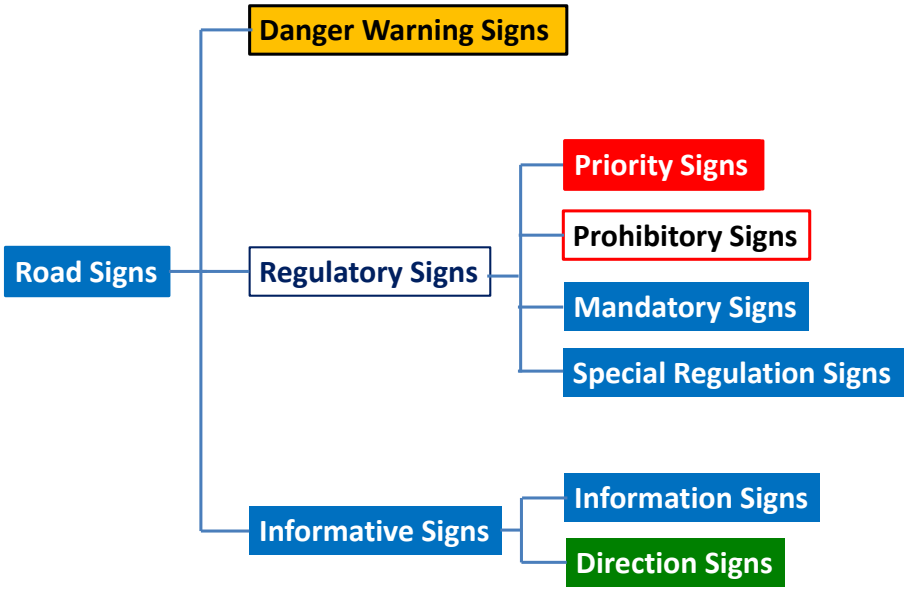
As mentioned at the start of this chapter, all annexes and protocols of the CBTA have been ratified by all member countries in 2015. Article 15 of the CBTA's main agreement stipulates that 'the member countries undertake to gradually adopt their road traffic regulations and signage to the rules and standards set out in Annex 7.' Article 2 of Annex 7 further stipulates that 'road signs, signals, symbols, and road markings on the routes and corridors designated in Protocol 1 of the Agreement shall be as prescribed in Attachment 2 to the Annex,' based on the Vienna Convention on Road Signs and Signals, and signed in 1968. The article provides a transition period of four years in case the characteristics of the road signs, signals, symbols are used with a different meaning from that prescribed by the agreement's attachment; and a 15-year transition period in cases where there are signs and markings that do not conform in principle to the system prescribed by the attachment.

Article 3 of the annex prescribes that (i) the use of language in road markings and signals can be limited to a minimum by the use of symbols; and (ii) the prescribed use of English/Latin

characters and Arabic numeral by no means prohibits the parallel use of the local language.

Road signs are categorised as either danger warning signs, regulatory signs, and information signs (Figure 1.7). Danger warning signs are intended to inform drivers of possible dangers or unusual conditions ahead. Regulatory signs are intended to inform drivers of special obligations, restrictions, or prohibitions with which they must comply.

Figure 1.7. Types of Road Signs



Source: Created by the author with reference to the classification of the Vienna Convention.

The regulatory signs are divided into priority signs, prohibitory signs, mandatory signs, and special regulation signs.

Priority signs indicate to drivers the order in which vehicles should pass intersection points (e.g., 'give way' and 'stop'). The prohibitory or restrictive signs are intended to prohibit certain types of manoeuvres or some types of traffic (e.g., 'no parking,' 'no entry,' and 'do not take over'). Most of the prohibitory signs are surrounded by a red fringed circle. The inside of the 'no parking' and 'no stopping' signs are blue-coloured with a slash or *x*, respectively. There are some exceptions, however, such as 'do not enter.'

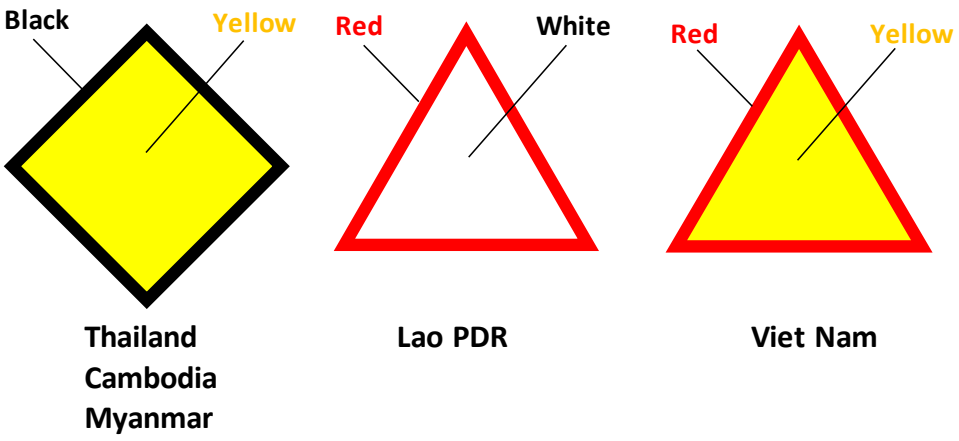
Mandatory signs are intended to set the obligations of all traffic that uses a specific area of the road. Unlike prohibitory ones, mandatory signs prescribe traffic what it must do. Most mandatory road signs are circular. In Inland ASEAN countries, these may use white symbols on a blue background with white border.

Special regulation signs indicate a regulation or danger warning applicable to one or more traffic lanes, lanes reserved for buses, the beginning or end of a built-up area, or signs having zonal validity.

Informative signs are intended to guide drivers or to provide other useful information. They are divided into information and direction signs, position or indication signs. The information signs inform drivers of the existence of an object such as a parking area, hospital, and gas station. They are rectangular with white symbols and backgrounds in either blue or green. The direction signs give information about the location of either the driver or possible destinations (e.g., '50 km to Phnom Penh').

Most signs in the five Inland ASEAN countries are universally recognised, with critical differences in special cases only. First, the appearances of danger warning signs differ (Figure 1.8). In Thailand, Cambodia, and Myanmar, the signs are diamond shaped with a yellow background and black borders. In Lao PDR and in Viet Nam, these have a triangular shape with red borders. The background is white in Lao PDR and yellow in Viet Nam.

Figure 1.8. Different Shapes and Colours of Danger Warning Signs



Source: Created by the author.

Second, Thailand uses a 'do not overtake' sign that differs from that used by the four other nations (Figure 1.9). The ones in Cambodia, Lao PDR, Myanmar, and Viet Nam are based on the Vienna Convention, which may come with or without a diagonal line such as the ones used in Viet Nam.

While the sign found in Thailand differs from the rest, it can be intuitively recognised and is used in Japan as well.

Figure 1.9. Signs for 'Do Not Overtake'

Cambodia
Lao PDR
Myanmar
Viet Nam

Thailand

Notes:
1) The picture on the upper left is a sign in Germany, while the basic designs are not different.
2) Both photos show actual signs used in Viet Nam.
Source: Created by the author and photos taken by the author.

Third, the sign for ‘stop’ is octagonal in shape (Figure 1.10), but expressed in the local language in Thailand. In Lao PDR, some signs are shown only in the local language while others are both in English and the local language. In Cambodia, these are shown in both languages. In Myanmar and Viet Nam, these are in English. In Viet Nam, however, seldom is the sign ‘stop’ seen even on the city streets.

Figure 1.10. Road Signs for ‘Stop’

Cambodia

Lao PDR

Myanmar

Thailand

Viet Nam

Note: In Viet Nam, the sign is designated, but is rarely seen.

Source: Photos are those by the authors as well as from websites.

Finally, the signs for hospitals are different in the four countries (Figure 1.11). The character H, which is based on the Vienna Convention, is not easily recognised intuitively; however, the white cross or crescent moon are also used according to the predominant religion. On the other hand, the sign in Thailand is not based on the Vienna Convention, but can be recognised intuitively.

Additionally, cultural differences can be identified from how road signs are used. In Lao PDR, the sign for ‘Do not overtake’ can be seen at curves. The sign for U-Turn is frequently used in Thailand, on the far-right lane with left-side driving country. For drivers to turn right, they

usually have to go straight, take a U-turn and turn left. In Viet Nam, signs for 'Do not enter' can be seen on the edge of median strips. In Myanmar, danger warning signs are expressed in English, using words such as 'Slow down' and 'School,' instead of symbols.

Other than the above-mentioned cases, drivers from these nations have a common understanding of the road signs, making them ready for an eventual increase in cross-border movements of vehicles. However, it would further help if the number of signs in local languages only is reduced.

Figure 1.11. Information Signs Indicating a Hospital

Cambodia

Lao PDR

Thailand

Viet Nam

Source: Photos taken by the author.

4. Laws on Road Transport

With the increase in cross-border traffic, any country-specific differences in transport or traffic rules have to be lessened to prevent confusion and road accidents. Thus, in this fiscal year project, the members of CLMV have been asked to review their domestic laws on road transport.

In Viet Nam, the Road Traffic Law stipulates broader issues. Such law was issued in 2001 and amended in 2008. In Cambodia and in Lao PDR, the laws are divided into the Road (Land) Law and Road (Land) Traffic Law. Lao PDR promulgated such laws in 2012. Cambodia, meanwhile, issued the Road Transport Law and the Road Traffic Law in 2014 and 2015, respectively.

Myanmar has its Land Transport Law, Motor Vehicle Law, and Highway Law. Historically, the fundamental laws like the civil law in Myanmar have been stipulated since the colonial era, while the current Land Transport Law, Motor Vehicle Law, and Highway Law were promulgated in 2016, 2015, and 2000, respectively.

The contents of the laws are diverse. In Cambodia, the Road Traffic Law prescribes rules such as on traffic signs, road use, pedestrians' walking, and traffic accidents. On the other hand, its Road Transport Law stipulates road classification, road development, and maintenance. In Lao PDR, traffic rules on technical standards, road safety, and prohibitions are stipulated in the Land Traffic Act, while matters such as business transport are covered by the Land Transport Law. In Myanmar, the Motor Vehicle Law stipulates matters on road safety, including the ceasing of importation of right-hand vehicles. Its Highway Law prescribes the construction and maintenance of roads in short-, medium-, and long-term plans. The Land Transport Law intends to reduce environmental pollution and improve efficiency of cross-border transport. In Viet Nam, these issues are under its Road Traffic Law. In countries such as Cambodia, transport-related laws have been recently legislated.

Note that this survey of the different transport rules of countries in Inland ASEAN is just the first step. Deeper analyses are needed henceforth.

5. Conclusions

This chapter reviews the history of the ASEAN Highway and MPAC. A comparison of the list of missing road links as well as roads identified for upgrade, with their current state reveals that there are sections where the need for an upgrade is not clear. This gap might be because the government staff assigned to monitor had failed to review the files in which road conditions are recorded regularly or failed to share the actual state of the roads with stakeholders. Thus, government officials should visit the fields themselves more frequently, and the information should be communicated to other government stakeholders, including the central government.

On the other hand, the new roads – especially expressways – that were improved recently have generated a positive economic impact such as increase in foreign direct investments and tourism, and expansion of distribution areas for agricultural products. In designing the highway and determining future locations, these positive experiences can be used as reference points.

Technical standards across Inland ASEAN nations do not differ much. One aspect where the difference does matter, however, is in the maximum weight limit. Countries whose maximum weight limit is higher than the standard of the AFAFGIT need to consider a reduction in their set weight. Also, road signs that have graphical differences across the Inland ASEAN nations should be harmonised. That is, nations could either harmonise their symbols or retain their own symbols but highlight the differences when training cross-border drivers.

Finally, it should be noted that transport-related laws are different amongst the Inland ASEAN countries; thus, a more extensive review of these laws need to be conducted.

In Chapter 2 of this publication, the transport facilitation programmes of transport-related ASEAN framework agreements, Greater Mekong Subregion's CBTA, and bilateral and trilateral arrangements for transport facilitation are examined. Chapters 3 to 6 show the current status of projects on national highways (i.e., expressways), including future plans, regulations of technical standards, road signs, and laws on transport or traffic in Cambodia, Lao PDR, Myanmar, and Viet Nam, respectively. Chapter 7 studies the impact of developments on corridor and sub-corridors using the Institute of Developing Economies Geographical Simulation Model. In particular, this model analyses the economic impact on the following areas:

- Northern sub-corridor of Cambodia
- National Highway No. 13N (North) of Lao PDR
- Lao PDR section of North–South Economic Corridor and Lao–Myanmar Friendship Bridge
- National Highway No. 3 in Myanmar
- Noi Bai–Lao Cai Expressway

It will be valuable to compare the actual situations of infrastructure development in the five nations with the simulation results in Chapter 7.

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