

Chapter II.

Currently existing standards on weights and dimensions for road freight vehicles

II.1 Standards on weights and dimensions along the Asian Highway network and beyond: current situation

II.1.1. Diversity of national standards on dimensions and weights along the Asian Highway network

National standards on road vehicles' weights and dimensions are interlinked with the road design. Countries set maximum permissible weights and dimensions for trucks according to status of the road network to ensure safety on the roads and reasonable wear of the road infrastructure and update them as long as the quality of the roads improves.

Review of the available information on allowable dimensions and weights of the freight road vehicles in the 32 countries that are part of the Asian Highway Network showed diversity of the currently enforced standards.

STANDARDS ON LENGTH

Dimensions of vehicles are limited by the size of the road infrastructure, road geometry and the need to ensure safety of vehicles, drivers and pedestrians. Countries along the Asian Highway implement six different limits on length for rigid truck with the smallest of 9.1 m and the longest allowable limit 12.2 m. Most of the countries, 18, limit length of a rigid truck in 12.0 m. Other five variants are less common and are used in a single country or in two countries (Table 2).

Not all of the countries separate the rigid and articulated vehicles in the standards. For instance, only one limit for the length of any kind of freight road vehicle is published in Nepal, Republic of Korea, Turkmenistan and Viet Nam.

There is more diversity in standards for articulated vehicles: truck and trailer combinations, road trains, etc. There are 14 variants of limit on length for this category. There are 8 countries that allow articulated vehicle to be no longer than 20.0 m, 4 countries limiting the length in 18.0 m and 3 countries in 18.75 m. Other ten variants are implemented either one standard by one country or one standard by two countries.

Table 2 Maximum permissible dimensions of a freight road vehicle in the countries of the Asian Highway network (aggregated)

Maximum Dimensions	Type of Vehicle	Value, mm	No. of countries
Length	Rigid Truck	9,100	1
	Minimum: 9,100	9,144	1
	Maximum: 12,200	10,000	1
	Number of lengths variants among the countries: 6	11,000	1
		12,000	18
		12,200	2
	Articulated Vehicle	14,000	1
	Minimum: 14,000	16,000	1
	Maximum: 25,000	16,700	2
	Number of lengths variants among the countries: 14	17,000	1
		17,400	1
		18,000	4
		18,750	3
		19,000	1
		19,800	1
		20,000	8
		20,750	1
		22,000	1

Maximum Dimensions	Type of Vehicle	Value, mm	No. of countries
		24,000	2
		25,000	1
Width	All types	2,500	13
	Minimum: 2,500	2,550	10
	Maximum: 3,000	2,600	4
	Number of widths variants among the countries: 5	2,900	1
		3,000	1
Height	All types	3,800	2
	Minimum: 3,800	4,000	17
	Maximum: 4,900	4,100	1
	Number of height variants among the countries: 8	4,200	2
		4,500	3
		4,600	1
		4,750	2
		4,900	1

Source: Compiled by V. Krechetova based on available national regulations (see list in the references) and open data, such as ESCAP's *Handbook on Cross-Border Transport along the Asian Highway Network*, materials of International Road Union (IRU), etc.

STANDARDS ON WIDTH

Standards on width in ESCAP countries are close: 2.50-2.55 m are the most common limits, but still in total there are five different limits on allowable width along the AH (Table 2). Ten countries limit the freight road vehicle length in 2.55 m. Thirteen countries limit the truck width in 2.5 m. In nine countries a truck with isothermal or refrigerator body is allowed to reach 2.6 m. There are four countries to set limits on vehicles' width in 2.6 m and the remaining two variants are implemented one standard by one country.

STANDARDS ON HEIGHT

Standards on height of vehicles and containers are connected to the design of tunnels and other vertical structures in the country. Most of the countries, 17, set the height limit for the freight road vehicle in 4.0 m (Table 2). There are seven other variants of limit on height implemented either one standard by one country or one standard by two/three countries.

STANDARDS ON WEIGHTS

Heavy vehicles on the road have direct impact of pavement and road structures. The impact of the vehicle's weight is transferred by the wheels and thus both gross vehicle weight and load per axles are regulated.

Standards on weights of the freight road vehicles are very diverse along the AH: there are 16 different limits for gross vehicle weight of a rigid vehicle and 15 different limits for articulated vehicles or road trains (Table 3). Practically, this means that limits on gross vehicle weight for rigid vehicle vary from country to country. The variability of the upper limit of weight is notable: there is the over two times difference between the lowest and the highest limits for gross weight of a rigid truck among the countries and 1.8 times difference between the same for an articulated vehicle or road train.

Table 3 Maximum permissible gross weight of a freight road vehicle in the countries of the Asian Highway network (aggregated)

Maximum Gross Weight, tonnes	Value, tonnes	No. of countries
Rigid Vehicle Minimum: 21 Maximum: 49 Number of variants among countries: 16	21.0	1
	21.3	1
	24.0	1
	25.0	2
	27.0	1
	27.2	1
	27.5	1
	29.7	1
	30.0	3
	31.0	1
	32.0	5
	34.0	2
	37.0	1

Maximum Gross Weight, tonnes	Value, tonnes	No. of countries
	38.0	1
	44.0	1
	49.0	1
Articulated Vehicle	36.0	2
Minimum: 36	38.0	1
Maximum: 61.5	40.0	3
Number of variants among countries: 15	41.0	1
	42.5	1
	44.0	11
	48.0	1
	49.0	1
	49.5	1
	49.6	1
	50.5	1
	51.0	1
	55.0	1
	56.0	1
	61.5	1

Source: Compiled by V. Krechetova based on available national regulations (see list in the references) and open data, such as ESCAP's *Handbook on Cross-Border Transport along the Asian Highway Network*, materials of International Road Union (IRU), etc.

Limits on permissible load per axle differ less (Table 4): there are 12 countries to limit load per single axle in 10 tonnes and 9 countries limit it in 11.5 tonnes. Other seven limits are implemented either one standard by one country or one standard by two countries.

Table 4 Maximum permissible weight per single axle and group axle of a freight road vehicle in the countries of the Asian Highway network

Maximum Axle Load	Value, tonnes	No. of countries
Load per single axle	8.0	1
Minimum: 8	9.1	1
Maximum: 13.5	10.0	12
Number of variants among countries: 9	10.197	1
	11.0	1
	11.5	9
	12.0	2
	13.0	1
	13.5	1
Load per group axles	20.0	1
Minimum: 20	20.4	1
Maximum: 31	21.0	2
Number of variants among countries: 11	22.0	4
	22.5	1
	24.0	7
	25.5	1
	26.0	2
	27.0	2
	30.0	1
	31.0	2

Source: Compiled by V. Krechetova (single axle) and S. H. Park (group axle) based on available national regulations (see list in the references) and open data, such as ESCAP's *Handbook on Cross-Border Transport along the Asian Highway Network*, materials of International Road Union (IRU), etc.

II.1.2. Gaps in standards on dimensions and weights of freight road vehicles along the Asian Highway

Analysis of national standards in the countries along the AH highlighted several issues complicating regulatory environment of regional road transport:

- Differences in values of limits to length, width, height of a vehicle, gross vehicles weight and axle load;
- Availability of standards;
- Comparability of standards in terms of units and structure, level of detail;
- Existence of seasonal or conditional changes in enforced standards.

Each of these items poses different challenges for international road transport. Differences in limits on dimensions and weight are described in section II.1.1, the rest of issues need some explanations.

AVAILABILITY OF STANDARDS

The information on permissible dimensions and gross weights/axle weights is not always readily available. Annex I presenting summaries of the national standards available shows the gaps in availability with the “..” sign. These are gaps in data found in open sources and they are present for about one third of the countries (12 out of 32).

The data are often available in national language only and have to be translated. Planning of a long haulage transport operation between Asia and Europe or just between several Asian countries, for example along one of the Eurasian Transport Corridors as studied by ESCAP in 2016-2017, would require certain costs purely for getting and translating the relevant regulations.

The other aspect is availability of primary source of information: texts of relevant ordinances, decrees, acts or other legal documents that state the standards in the most recent version, incorporating all amendments to date. Even in the countries with existing official governmental on-line databases of legal documents the search might yield no result. Thus, in the current study for some countries the information is presented based on secondary sources (as indicated in the sources to the table in the Annex I).

Difficulty in accessing information on such standards certainly impedes work of transport operators and thus ESCAP, International Road Union or national road associations of some countries make effort to gather and make available such information. For a single company, it might be the task with prohibitive costs beyond its workforce's and financial capacity.

The best way to overcome current lack of information and facilitate the planning of the international transport operations is making sure that each country has the information open and easily accessible. Optimal situation is when agency authorized to control standards implementation and penalize non-compliance (traffic police, highway department, for instance) publishes online the relevant statute, ordinance, directive or other legal document and supplement it by summary of the standards in national and English languages and any language of an important partner. All versions need to be kept up-to-date. Central database of relevant official documents and summaries of vehicle standards for whole Asian Highway network would be instrumental to overcome the present lack of information. Channels to get the actual information and application of regulations in more specific situations by phone, mail or other means should be open and maintained.

COMPARABILITY OF STANDARDS

In most countries along AH, standards on weight and dimensions of road vehicles use metric system (meters (millimetres) and tonnes (kilograms)) and thus are compatible and comparable. There are, however, rare cases when standards use different units: feet for dimensions¹ or while usually weight per axle is converted to kilograms and respective axle loads are provided per type of axle for clarity, sometimes only one limit in unit of force - kiloNewton (kN) is available².

Another aspect of comparability of standards is their structure and level of detail. Box 1 shows extracts from two standards on dimensions and weight of road vehicles; one implemented in China and one implemented in Mongolia. Documents are similar in purpose and functions and for comparison only information in regards dimensions of freight road vehicles is selected.

The situation is even more complicated in regards standards on weights. For example, in case of axle load there is no uniformity whether the single axle limit is set separately for steering axle. It is common that limits on axle load per group axle are set based on distance between axles in the group. Based on types of trucks, towing vehicles and trailers used in countries, in addition to these categories, limits might also be set separately for vehicles with air suspension or with double-tire wheels.

¹ 'The [Baluchistan] [N.W.F.P.] [Punjab] [Sindh] Motor Vehicles Rules', 1969.

² Government of Nepal, Ministry of Physical Infrastructure & Transport, Department of Roads Planning and Design Branch Road and Traffic Unit, 'Nepal Road Standard 2070', 2013.

SEASONAL CHANGES IN STANDARDS

In countries with big seasonal variation of weather conditions, standards might allow for temporary reduction in weight limits for road vehicles to preserve road surface quality. Usually, these reductions concern roads in poor conditions. For instance, during rainy season (June 1 to November 30), Lao People's Democratic Republic reduces limits on weights for vehicles travelling along red soil and natural roads by 20%¹.

Box 1 Examples of national limits on freight road vehicles dimensions

Example 1 Extract from National Standard GB 1589-2016, China, combined information on freight road vehicles from tables 1 and 2 of the Standard

Vehicle type		Vehicle length (mm)	Vehicle width (mm)	Vehicle height (mm)	
Stake Truck Dropside Truck Flat Bed Truck Dump Truck	With two axles	Maximum designed gross mass ≤3,500 kg	6,000	2,550	4,000
		Maximum designed gross mass >3,500 kg, and ≤8,000 kg	7,000		
		Maximum design gross mass >8,000 kg, and ≤12,000 kg	8,000		
		Maximum design gross mass >12,000 kg	9,000		
	With three axles	Maximum design gross mass ≤20,000 kg	11,000		
		Maximum design gross mass >20,000 kg	12,000		
With four axles including double front steering axle		12,000			
Stake Trailer Dropside Trailer Flat Bed Trailer Dump Trailer	With one axle	8,600	2,550	4,000	
	With two axles	10,000			
	With three axles	13,000			
Road Vehicle	Four wheel truck with maximum design speed less than 70 km/h ^a	6,000	2,000	2,500	
	Trucks and towing vehicle for trailers	12,000 ^b	2,550 ^c	4,000	
Other Trailer	Semi-trailer	13,750 ^e	2,550 ^c	4,000	
	Trailer with centre axle, towing handle	12,000 ^f			
Road trains	Tractor and trailer articulated vehicle	17,100 ^g	2,550 ^c	4,000	
	Freight road train	20,000 ^h			

Source: People's Republic of China National Standard GB 1589-2016: Limits of Dimensions, Axle Load and Masses for Motor Vehicles, Trailers and Combinations Vehicles.'

Notes:

^b Not applicable to the special purpose vehicles, separate standard in used.

^c Maximum limit on width of a refrigerator truck is 2,600 mm.

^e Maximum limit on length for a semi-trailer for carriage of 45 ft containers is 13,950 mm.

^f Maximum limit on length of a vehicle body is 8,000 mm (except for the car-carrier trailer with central axle).

^g Maximum limit on length for a long nose articulated vehicle is 18,100 mm.

^h Maximum limit on length for a long nose car carrying road train with trailer with central axle is 22,000 mm.

Example 2 Extract from Mongolian State Standard: General Requirement for Technical Condition of Road Vehicles MNS 4598:2011 (Code: 43.040.01), information on freight road vehicles from table 2 and article 5.8.

No	Type of transport vehicles	Length, m
3	trailer	12
4	semi-trailer with towing vehicle	16.5
5	articulated vehicle of truck and trailer	18.75
6	other transport vehicles	18.5

5.8.3. Limit on the width of the vehicle is 2.5 m, (...) the height of loaded vehicle shall not exceed 4.0 m.

Source: Mongolian State Standard: General Requirement for Technical Condition of Road Vehicles MNS 4598:2011 (Code: 43.040.01)

In 2011-2017, in the Russian Federation, limits on axle load of heavy road vehicles could be reduced in spring for a period of no more than 30 days if water saturation of the roadbed was excessive and in summer if the daytime temperature was higher than 32°C (than the limitation was applied daytime only)². Since January 2018,

¹ 'Regulation on Approval of Total Maximum Weight of Trucks, No.: 13848/MPWT from 26 September 2013, Ministry of Public Works and Transport Lao People's Democratic Republic'.

² 'Order of the Ministry of Transport of the Russian Federation No 211 from 12 August 2011 "On Approval of the Rules on Temporary Limitations or Terminations of Movement of Transport Vehicles along the Federal Roads and Private Roads"'.

the spring time limitation is abolished at federal roads, however, the summer heat limits and spring limits for provincial and municipal roads remained¹. Regions (oblast, krai, etc.) decide on seasonal changes based on the situation in place and limits might go down to 3.5-8 tonnes per single axle². Situation affect the parts of the AH routes in the Russian Federation that follow regional roads. The restrictions are not applicable to the international road operations implemented under special permits, however, such operations still might be impacted indirectly.

Similar rules are implemented in Kazakhstan where in spring (March – April) the axle load per single axle is reduced to 8 tonnes/axle³. Again, the regulation has an indirect impact on international transport operations as they are exempted. Tajikistan limits axle load on public roads in period May to August if daytime temperature exceeds 25°C. For part of the roads the maximum axle load for the period is 6 tonnes, for the rest – 8 tonnes⁴.

II.1.3.Examples of regional and subregional multilateral standards on weight and dimensions

EUROPEAN UNION

Countries of the European Union (28 countries⁵) defined maximum permissible weights and dimensions of vehicles that all members are agree to allow on their territories. Under the first directive (Council Directive 85/3/EEC) dated to 19 December 1984 member countries could maintain national standards but were not in right to deny entry of a vehicle that complied the standards for weight and dimensions set by the directive. If a country applied higher limits at their territories, then it could accept bigger/heavier vehicle at its territory.

On later stages after the opening of the borders in 1993, to ensure fair competition, the national standards were aligned with the EU ones. With accession of Finland and Sweden where longer vehicles were already in use, derogation on length was introduced⁶. There are exceptions based on consideration of environmental sustainability: maximum length of vehicles and maximum weights of vehicles that run on alternative fuels. As of 2018, the dimensions and weights of the vehicles circulating within the EU borders are regulated by the Council Directive 96/53/EC⁷ and Directive (EU) 2015/719⁸ (for some maximum values see Table 5 and Annex I).

While the standards within the EU space are unified, the regulations on vehicle dimensions and weights for transport operations between EU member-countries and the third countries are regulated by respective bilateral agreements. With Switzerland, Norway, Iceland and Liechtenstein, EU has agreements that supersede bilateral agreements⁹.

EURASIAN ECONOMIC UNION

One of the goals of the Eurasian Economic Union (EAEU¹⁰) is creation of the common transport space and harmonization of legislations and technical regulations of transport is among the key tasks. Overall, the member countries aim at harmonizing not only the regulations on weight and dimensions for the vehicles on the EAEU public roads that are parts of main international transport corridors but also at establishment of

¹ 'Order of the Ministry of Transport of the Russian Federation No 496 from 24 November 2017 "On Amending Rules on Temporary Limitations or Terminations of Movement of Transport Vehicles along the Federal Roads and Private Roads Approved by the Order of the Ministry of Transport of the Russian Federation No 211 from 12 August 2011"'.
² 'Limits on Heavy Vehicles on the Roads of Russia - 2017', *Dorinfo*, 2017 <http://dorinfo.ru/99_detail.php?ELEMENT_ID=51870> [accessed 11 February 2018].

³ 'Order of Minister of Transport and Communications of the Republic of Kazakhstan No 162 from 11 March 2013 "On Movement of Transport Vehicles on Public National Roads of the Republic of Kazakhstan"'.
⁴ 'Government Decree of the Republic of Tajikistan No 569 from 8 November 2011 "On Setting the Seasonal Limits of the Masses and Axle Loads of Transport Vehicles Moving on the Public Roads"'.
⁵ As of February 2018, EU member countries are: Austria, Italy, Belgium, Latvia, Bulgaria, Lithuania, Croatia, Luxembourg, Cyprus, Malta, Czech Republic, Netherlands, Denmark, Poland, Estonia, Portugal, Finland, Romania, France, Slovakia, Germany, Slovenia, Greece, Spain, Hungary, Sweden, Ireland, and the United Kingdom.

⁶ 'Letter from Siim Kallas, Vice-President of the European Commission, to Mr. Brian Simpson, Chairman of the Transport and Tourism Committee.', 2012.

⁷ 'Council Directive 96/53/EC of 25 July 1996 Laying down for Certain Road Vehicles Circulating within the Community the Maximum Authorized Dimensions in National and International Traffic and the Maximum Authorized Weights in International Traffic', p. 53.

⁸ 'Directive (EU) 2015/719 of the European Parliament and of the Council of 29 April 2015 Amending Council Directive 96/53/EC Laying down for Certain Road Vehicles Circulating within the Community the Maximum Authorised Dimensions in National and International Traffic and the Maximum Authorised Weights in International Traffic'.

⁹ The European Commission. <https://ec.europa.eu/transport/modes/road/non-eu-countries_en>

¹⁰ As of February 2018, EAEU member countries are: Armenia, Belarus, Kazakhstan, Kyrgyzstan and the Russian Federation.

common payment control system, dispute resolution mechanism for carriers of EAEU and the third countries as well as mechanism on return of vehicles that violated international transport regulations¹.

Dimensions and weights of the vehicles allowed on the roads of EAEU (Annex I) are set in the Technical Regulations TP TC 018/2011 of the Customs Union (predecessor of the EAEU) “On Safety of the wheeled transport vehicles”. The Regulations were approved in 2011 and entered into force on January 1, 2015 with transition period ended in July 2016. Timing for application of the Regulations in Armenia and Kyrgyzstan who joined the EAEU in 2015 is determined in the respective accession agreements.

In terms of definitions, categories of vehicles and technical aspects, the Regulations are harmonized with²:

- *Agreement Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations*, Geneva, 1958;
- *Agreement Concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of Such Inspections*, Vienna, 1997;
- *Agreement Concerning the Establishing of Global Technical Regulations for Wheeled Vehicles, Equipment and Parts which Can Be Fitted and/or Be Used on Wheeled Vehicles*, Geneva, 1998.

II.2 Harmonization of standards on weights and dimensions: need for and potential benefits

II.2.1. Standards on weights and dimensions along the Eurasian Transport Corridors: case studies

The impact of the differences on weight and dimensions standards at the AH could be illustrated by the situation along the Eurasian Transport Corridors (Figure 3), selected and analysed by ESCAP in the study of 2016-2017³. The road routes of the three transcontinental corridors follow AH network and might be used for both shipments within Asia or Asia to Europe going across several land borders. Below, the three branches of the corridors (one branch per Eurasian Corridor) are used as examples to showcase the impediments to the seamless international road transport due to existing gaps in standards and lack of harmonization along the AH. At the west two of the corridors (Northern and Central) join the space of EU and therefore the relevant EU regulations are included in these small case studies.

CASE STUDY 1. EURASIAN NORTHERN CORRIDOR: ROUTE N1 (AH3–AH6/AH8)

The route extends from port of Tianjin in China to borders of Russian Federation with Belarus and Finland passing through Mongolia (Figure 4). Countries along the route are actively cooperating to enhance connectivity: the route is covered by respective bilateral and multilateral agreements and situation with compatibility of vehicle standards is fair.

China, Mongolia and the Russian Federation have bilateral road transport agreements that allow for international transport under single roundtrip permits. Agreements between China and the Russian Federation (1992), Mongolia and the Russian Federation (1996) do not set special requirements for dimensions and weights of vehicles in the international transport; vehicles should comply with the national standards of the country they travel within.

¹ Eurasian Economic Commission, ‘Information on Transport’, 2015.

² ‘Technical Regulations TP TC 018/2011 of the Customs Union “On Safety of the Wheeled Transport Vehicles” Approved by the Decision of the Custom Union’.

³ *Comprehensive Planning of Eurasian Transport Corridors to Strengthen the Intra- And Inter-Regional Transport Connectivity. Study Report 2017* (ESCAP, 2017) <<http://www.unescap.org/sites/default/files/Study%20Report%20Eurasian%20Corridors-Final.pdf>>.

Table 5 Limits on dimensions and weight of the freight road vehicle in the countries along the Eurasian Northern Corridor (route N1)

	Maximum Width, mm	Maximum Height, mm	Maximum Length, mm		Maximum Gross Weight, tonnes		Maximum Axle Load, tonnes	
			Rigid truck	Articulated Vehicle/Road Train	Rigid Truck	Articulated Vehicle/Road Train	Group Axles	Single Axle
China	2,550	4,000	12,000	20,000	31.00	49.00	24.00 ⁱ	11.5 ⁱⁱⁱ
Mongolia	2,500	4,000	12,000	18,750	-	44.00	N.A.	11.5
Russian Federation	2,550 ⁱⁱ	4,000	12,000	20,000	35.00	44.00	26.00 ⁱ	11.5
EU	2,550 ⁱⁱ	4,000	12,000	18,750	32.00	44.00	24.00 ⁱ	11.5

Source: National standards as indicated in the footnotes to the Annex I.

Notes:

i – for tridem axle

ii – 2,600 mm for truck with isothermal or refrigerator body

iii – for powered axle

N.A. – data are not available.

- the limit is not set by the standard.

In 2016, the three countries concluded the Agreement on International Road Transport along the Asian Highway network. The Agreement sets multilateral permit system to be used to the cargo haulage by the indicated AH routes: multilateral single round trip road transport permit with one year validity. As for the dimensions and weight standards it refers to the respective national regulations. The Agreement covers AH3 and AH4, but might be extended to cover more AH routes if any party to the AH Agreement (2003) wishes to join.

The three countries along the N1 route of the Eurasian Northern Corridor have identical limits on vehicle's widths, height, length of rigid truck and load per single axle (Table 5). Same holds in the EU space. Obstacles arise if an articulated vehicle is to be used: while China and the Russian Federation allow road trains of 20.0 m, Mongolia and the EU limit their length in 18.75 m. Thus, vehicle chosen to go via Mongolia or to enter EU would be smaller than one that can operate in China or the Russian Federation.

The three countries and the EU have different limits on the gross weight of a rigid truck (Table 5) and while the highest national permissible value is 35 tonnes (Russian Federation), hypothetical haulage from China to EU by this route would be limited to 31 tonnes/truck which is the lowest limit along the way (China). Moreover, in this case there is uncertainty about the actual limit on the gross weight for such a truck as in standard MNS 4598:2011 of Mongolia the classification follows only number of axles so potentially, the cap might be even lower depending on the truck chosen.

China allows for the heaviest articulated vehicles among the four regulatory environments along the route, 49 tonnes, meaning that China freight forwarders and shipping companies would either underload trucks or keep smaller vehicles to send them along this route. Attention would be also paid to the axle load as China's 24 tonnes limit per tridem axle is lower than 26 tonnes allowed in the Russian Federation.

CASE STUDY 2. EURASIAN CENTRAL CORRIDOR: ROUTE C1–C2 (AH4–AH65–AH62–AH63–AH5–AH1)

The route C1 – C2 of the Eurasian Central Corridor goes from Urumqi (China) to Irkeshtam (Kyrgyzstan), Dushanbe (Tajikistan), Termez (Uzbekistan), Tejen and Turkmenbashi (Turkmenistan), Baku (Azerbaijan), Tbilisi and Batumi (Georgia) to Gerede, Istanbul (Turkey) and to the border with EU (Figure 5).

Countries along the corridor are making steady progress in creating enabling legal environment for international road transport along the corridor. In 2018, Uzbekistan opened 47 new routes for international transit and the same year after signing the Agreement on Strategic Partnership, Tajikistan and Uzbekistan extended transit time for freight road vehicles up to 15 days¹. China and Georgia are finalizing bilateral international road transport agreement². There are some impediments remained. As of 2017, only bilateral transport was possible at Karamyk at Kyrgyzstan and Tajikistan border, the border crossing was closed for international transit. Then, though pairs of bordering countries along the route have bilateral road agreements

¹ 'Uzbekistan and Tajikistan signed Agreement on Strategic Partnership', *TASS Russian News Agency*, 2018

<<https://tass.ru/mezhdunarodnaya-panorama/5466253>> [accessed 28 February 2019]; Iskandar Firuz and Barot Yusufi, 'Uzbekistan facilitated freight transit via its territory', *Radio Ozodi*, 2018 <<https://rus.ozodi.org/a/29668614.html>> [accessed 28 February 2019].

² Ministry of Economy and Sustainable Development of Georgia, 'Negotiations on International Passenger and Freight Transportation between Georgia and China Successfully Completed', 2018 <<http://www.economy.ge/?page=news&nw=837&lang=en>> [accessed 28 February 2019].

or other related agreements, agreements for freight road transport between countries lying farther apart are in some cases missing.

Existing bilateral road transport agreements might refer to national vehicle standards (as in case of Georgia – Turkey agreement (1992), Turkmenistan – Uzbekistan (1996), Kyrgyzstan – Tajikistan (2013)). This means that for an international haulage, operator would select vehicle that complies with the lowest of applicable standard.

Countries along the route have similar standards on vehicle height (4.0 m); only Georgia sets the limit at 4.3 m for transport of containers leaving limit for other cases in 4.0 m. There are two different standards on width: 2.50 m in Tajikistan and Turkmenistan and 2.55 m in other countries. Five countries and EU allow trucks with isothermal body to be up to 2.6 m wide. While the countries that separate length limits for rigid and articulated vehicles have identical limit for rigid trucks (12 m), they have four different limits for articulated vehicles. Most common limit is 20 m and a 20 m articulated vehicle would be accepted at the Central Asian section of the route, Azerbaijan and Turkey. However, if the shipment has to go to EU space or via Georgia, then the limit to the articulated vehicle drops to 18.75 m which is notably lower than for the most of the corridor.

There are more differences in weight limits (Table 6). Maximum permitted axle load is 10.0 tonnes per single axle in Azerbaijan, Tajikistan and Turkmenistan, and 11.5 tonnes in all other countries. Maximum load per group axle varies from 22.5 tonnes (Tajikistan) to 26 tonnes in Kazakhstan. There are three different limits on maximum permissible gross weight for a rigid vehicle in the countries that set this limit. The most common limit on weight of an articulated vehicle is 44 tonnes, however, there are four different limits on gross weight with the lowest being 36 tonnes.

Table 6 Limits on dimensions and weight of the freight road vehicle in the countries along the Eurasian Central Corridor (route C1 – C2)

	Maximum Width, mm	Maximum Height, mm	Maximum Length, mm		Maximum Gross Weight, tonnes		Maximum Axle Load, tonnes	
			Rigid truck	Articulated Vehicle/Road Train	Rigid truck	Articulated Vehicle/Road Train	Group Axles	Single Axle
China	2,550	4,000	12,000	20,000	31.00	49.00	24.00 ⁱ	11.5 ⁱⁱⁱ
Kyrgyzstan	2,550 ⁱⁱ	4,000	12,000	20,000	32.00	44.00	26.00	11.5
Tajikistan	2,500 ⁱⁱ	4,000	12,000	20,000	-	40.00	22.50	10.0
Uzbekistan	2,550 ⁱⁱ	4,000	12,000	20,000	32.00	44.00	24.00	11.5
Turkmenistan	2,500	4,000	-	24,000	N.A.	36.00	22.00	10.0
Azerbaijan	2,550	4,000	12,000	20,000	32.00	44.00	24.00 ⁱ	10.0
Georgia	2,550 ⁱⁱ	4,000 ^{iv}	12,000	18,750 ^v	24.00	44.00	24.00 ⁱ	11.5
Turkey	2,550 ⁱⁱ	4,000	12,000	22,000	32.00	44.00	24.00 ⁱ	11.5
EU	2,550 ⁱⁱ	4,000	12,000	18,750	32.00	44.00	24.00 ⁱ	11.5

Source: National standards as indicated in the footnotes to the Annex I.

Notes:

i – for tridem axle

ii – 2,600 mm for truck with isothermal or refrigerator body

iii – for powered axle

iv – 4,300 mm for carriage of cars or containers

v – 20,000 mm for specialized road train

N.A. – data are not available.

- the limit is not set by the standard.

In conclusion, for a hypothetical haulage using the route C1 – C2 of the Eurasian Central Corridor most of the operators would need to select (purchase and maintain) smaller vehicles than are allowed in their countries meaning more trucks needed for the same volume of goods, more associated costs and environmental impact.

CASE STUDY 3. EURASIAN SOUTHERN CORRIDOR: ROUTE S1–S1A (AH1–AH2)

The stretch of the Eurasian Southern Corridor selected for the case study runs from Shenzhen in China to Viet Nam and then to Cambodia, Thailand, Malaysia and ends at Singapore (Figure 6).

Among the six countries only Cambodia and Viet Nam (1998) and China and Viet Nam (1994) have bilateral road agreements. The agreements refer to national standards in terms of vehicles dimensions and weight. Movements between Cambodia and Thailand are regulated by Memorandum of Understanding (MOU) on the Exchange of Traffic Rights for Cross Border Transport through the Aranyaprathet-Poipet Border Crossing Points, 2008. Border between Thailand and Malaysia is open only to road transport of perishable goods to Singapore by the MOU from 1979.

Table 7 Limits on dimensions and weight of the freight road vehicle in the countries along the Eurasian Southern Corridor (route S1 – S1A)

	Maximum Width, mm	Maximum Height, mm	Maximum Length, mm		Maximum Gross Weight, tonnes		Maximum Axle Load, tonnes	
			Rigid truck	Articulated Vehicle/Road Train	Rigid truck	Articulated Vehicle/Road Train	Group Axles	Single Axle
China	2,550	4,000	12,000	20,000	31.00	49.00	24.00 ⁱ	11.50 ⁱⁱⁱ
Viet Nam	2,500	4,200 ^x	-	20,000	34.00	48.00	24.00 ⁱ	10.00
Cambodia	2,600	4,100	9,100	16,700	30.00	40.00	24.00 ⁱ	10.00
Thailand	2,550 ⁱⁱ	4,000	12,000	16,000	30.00	50.50	25.50 ⁱ	11.00
Malaysia	N.A.	N.A.	N.A.	25,000	27.00	51.00	21.00	12.00
Singapore	2,600	4,500	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Source: National standards as indicated in the footnotes to the Annex I.

Notes:

i – for tridem axle

ii – 2,600 mm for truck with isothermal or refrigerator body

iii – for powered axle

x – 4,350 mm for container trucks

N.A. – data are not available.

- the limit is not set by the standard.

Unlike the two examples above, the route goes both through countries with right- and left-hand traffic. The switch happens at the Cambodia – Thailand border. Right-hand traffic is at the section China – Viet Nam – Cambodia and left-hand traffic is used further at the Thailand – Malaysia – Singapore section.

Due to situation with exchange of traffic rights along the route, the case study is rather a theoretical exercise. Since the agreements refer to national standards on dimensions and weights, then the lowest limits should be observed which would be for a rigid truck, for instance, no bigger than 2.5 m wide, 4.0 m height, 9.1 m long, weighing less than 27 tonnes and no more than 10 tonnes per single axle.

There are three different limits on vehicles' width with the lowest of 2.5 m (Table 7). Four different limits are applied to height with 4.0 m being the lowest in China and Thailand and higher limits in Viet Nam, Cambodia and Singapore.

Limit on length of a rigid truck is not always available and known ones differ substantially – 9.1 m and 12.0 m. As for the total length of an articulated vehicles/road trains, two of five countries with available length limit it in 20.0 m, Thailand allows 16,0 m, Cambodia in 16.7 m and Malaysia allows vehicles up to 25.0 m long.

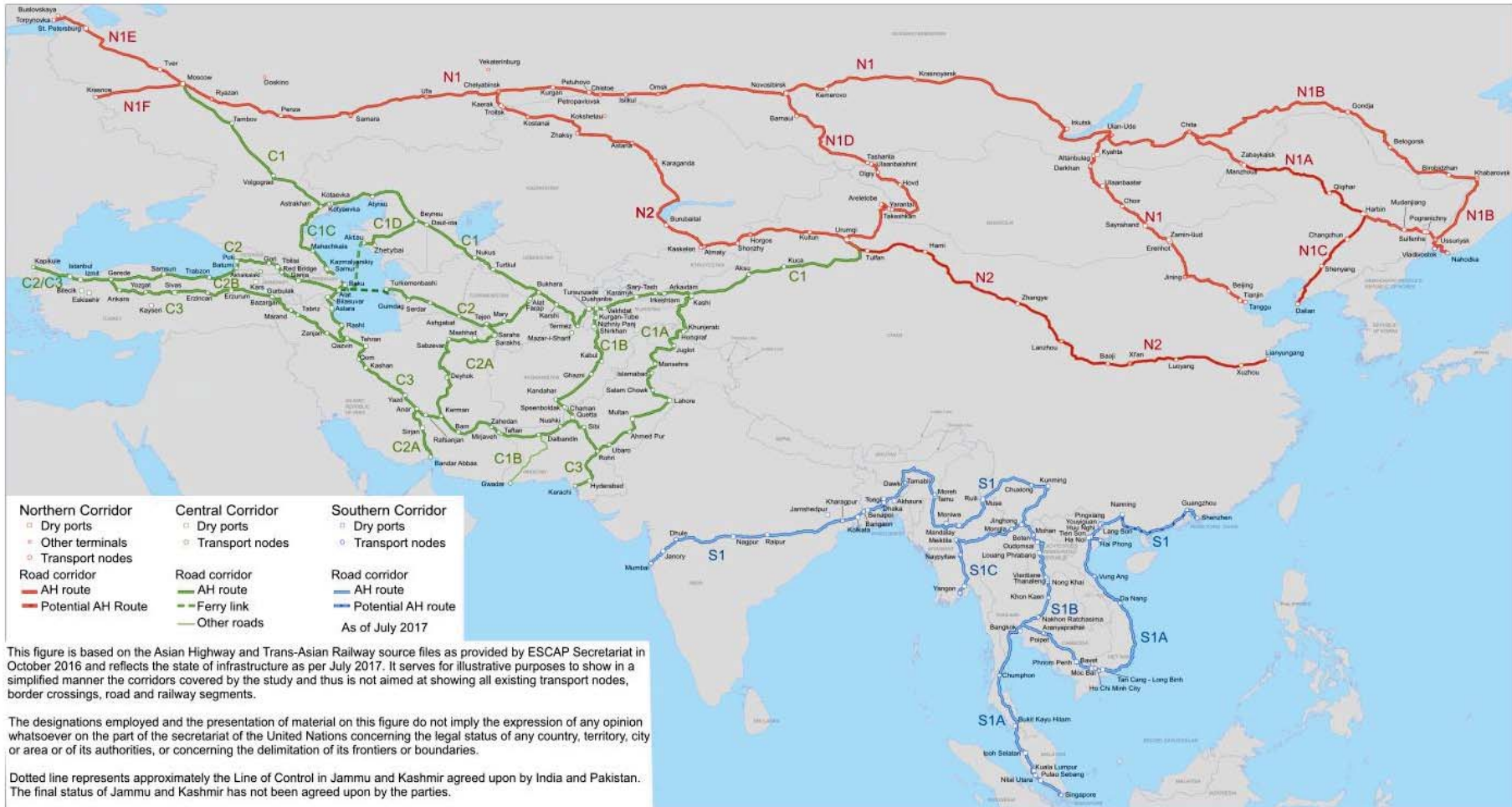
Limits on gross vehicle weight vary from 27 to 34 tonnes per rigid truck and from 40 to 51 tonnes for articulated vehicle and each country along the route sets its own limit. There are three variants in limits of weight per group axle and four variants for a weight per single axle.

The situation is complicated not only by the variability of standards, but by the differences in availability of the standards. For the three countries of the six the standards are either not available or not clear.

Differences in standards might force operators from countries with higher permissible dimensions or weights take economically suboptimal choices. For instance, an articulated vehicle that might go from China to Cambodia via Vietnam would be no heavier than 40 tonnes though China allows 49 tonnes and Viet Nam 45 tonnes. Again, in the opposite direction the vehicles should be below 4.0 m despite the fact that 4.1 m are allowed in Cambodia and 4.2 m in Viet Nam.

On the other hand, vehicles with weight exceeding the road capacity in Cambodia would damage the pavement and drive up maintenance costs and increase safety risks. Similarly, high vehicles would not pass under bridges or within tunnels in China who designs road structures for lower height limits.

Figure 3 Eurasian Transport Corridor (road routes only)



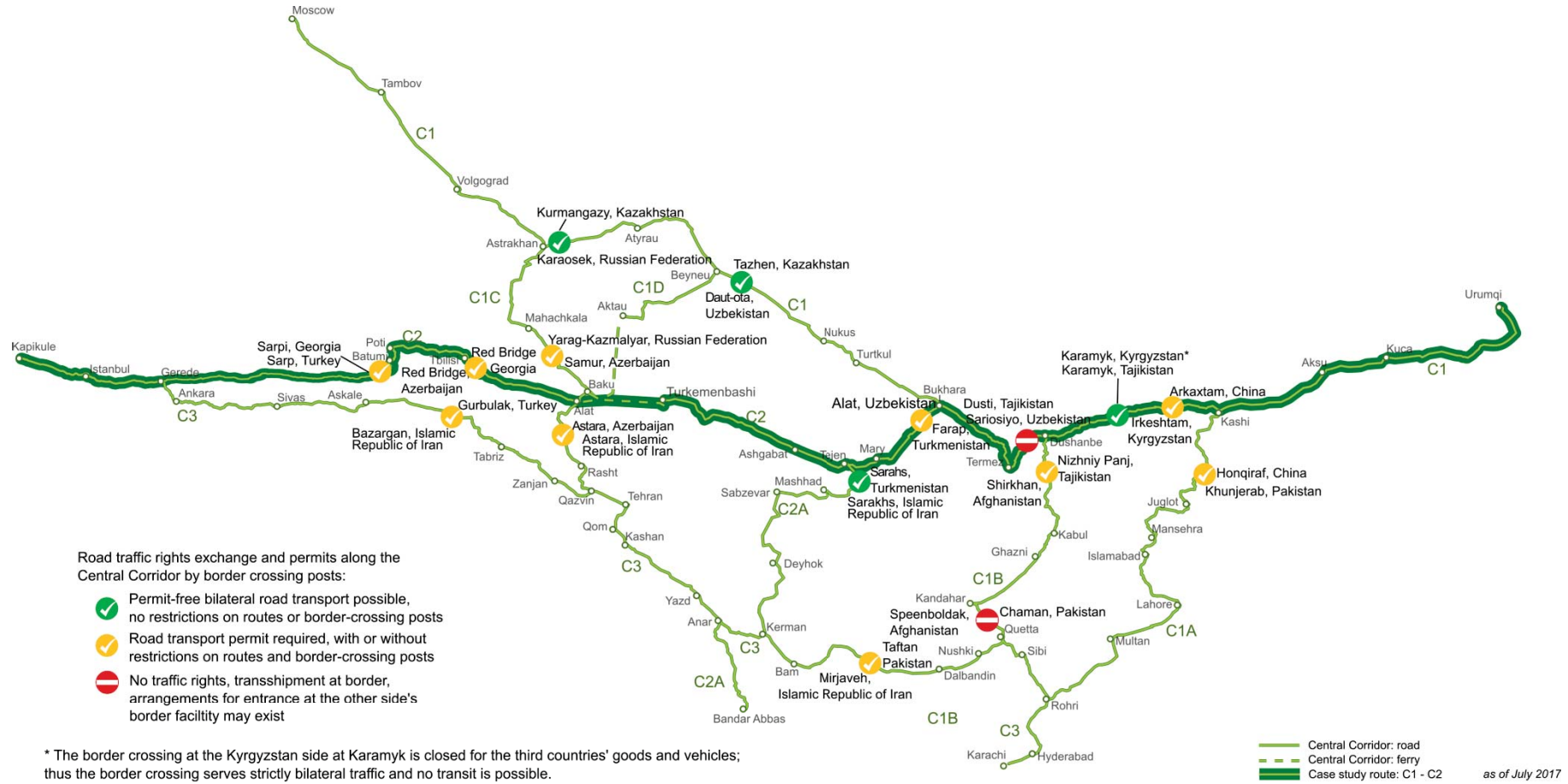
Source: Comprehensive Planning of Eurasian Transport Corridors to Strengthen the Intra- And Inter-Regional Transport Connectivity. Study Report 2017 (ESCAP, 2017)

Figure 4 Route of the case study 1: Eurasian Northern Corridor



Source: Comprehensive Planning of Eurasian Transport Corridors to Strengthen the Intra- And Inter-Regional Transport Connectivity. Study Report 2017 (ESCAP, 2017)

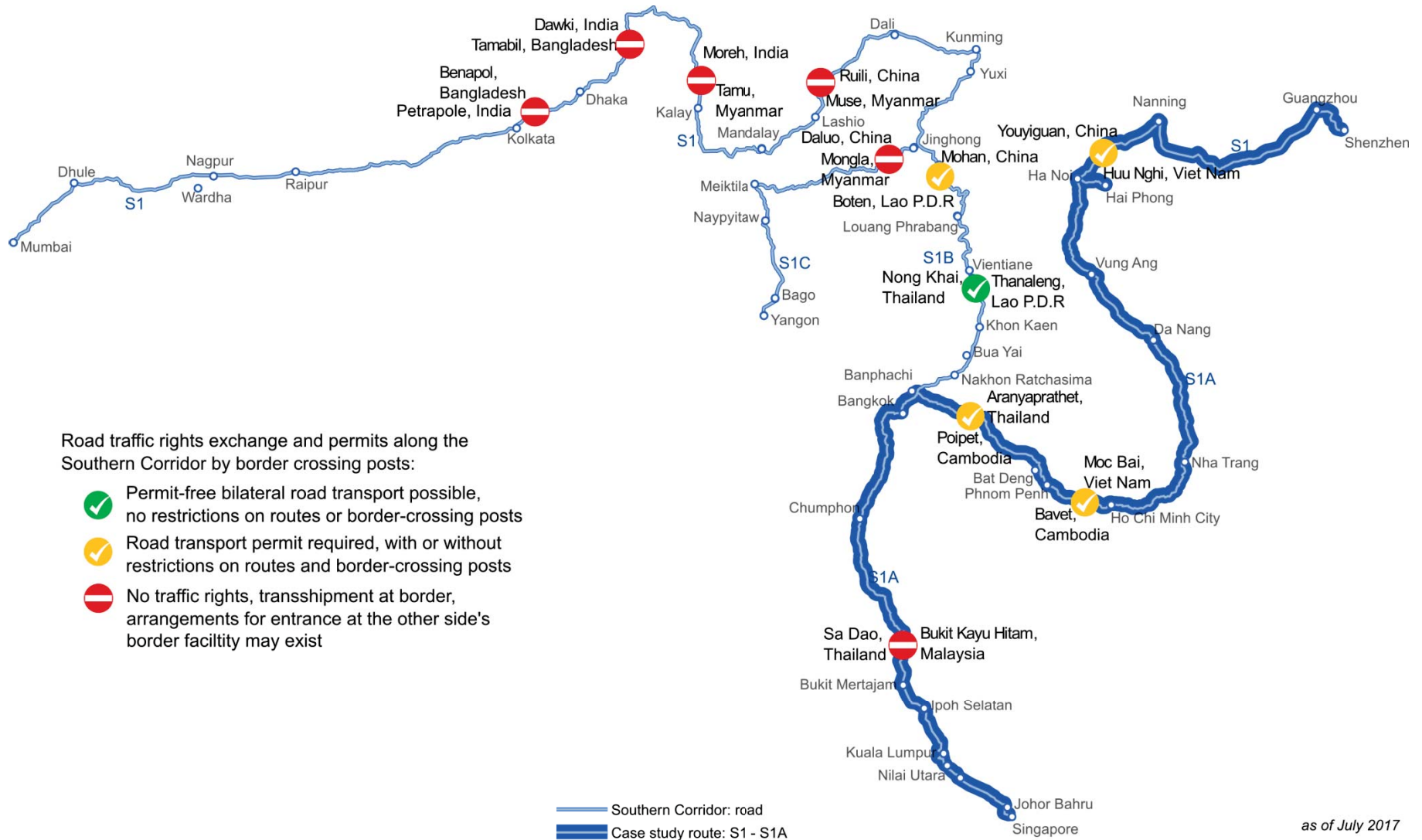
Figure 5 Route of the case study 2: Eurasian Central Corridor



* The border crossing at the Kyrgyzstan side at Karamyk is closed for the third countries' goods and vehicles; thus the border crossing serves strictly bilateral traffic and no transit is possible.

Source: Comprehensive Planning of Eurasian Transport Corridors to Strengthen the Intra- And Inter-Regional Transport Connectivity. Study Report 2017 (ESCAP, 2017)

Figure 6 Route of the case study 3: Eurasian Southern Corridor



Source: Comprehensive Planning of Eurasian Transport Corridors to Strengthen the Intra- And Inter-Regional Transport Connectivity. Study Report 2017 (ESCAP, 2017)

II.2.2. Impact of diversity of standards on international road transport and potential benefits of their harmonization

For the international road transport, differences in technical regulations on vehicles are barrier: by increasing costs of international road transport they are, in their nature, one of the nontariff barriers to trade.

To meet the criteria of the country or countries to which trucking operations are planned, transport operators might use costly coping strategies and measures. Some examples are:

- Operators need to keep in their fleet additional trucks that are eligible to travel on roads of the other country/countries. For instance, this situation was observed in Canada, where transport operators could enter USA under NAFTA but the regulations on dimensions and weight between the two countries differed¹.
- In case of transit operations through the country with lower permissible weights, operators either underload their trucks to make it compatible with the lowest standards along the road or they might need to use additional truck to load excessive cargo (for divisible cargos), move it across the said territory and then load it back at the border with the third country².

Moreover, the differing standards lead to more time spent on preparing and carrying out a trucking operation:

- Weight, axle loads and dimensions of vehicles have to be checked at the border crossings, adding to the border crossing delays and costs.
- In cases that the movement of such truck is allowed under special permit, time is needed to get such permits for over-sized/over-weight vehicles to pass territories of other countries.
- Time restrictions on usage of highways (for instance seasonal decrease of axle load in daytime hours during hot weather) may cause delays if scheduling for out of the restricted hours is, for any reason, difficult.

Impact of the diversity of the vehicle regulations on trucking industry was analysed in the countries where the vehicles are regulated fully or partially at provincial or states level, for instance in Canada and USA.

Up to 1980s, Canada's transport industry existed in the environment with truck regulations of weights and dimensions set at provincial level. The differences in standards were serious impediment to the domestic trade and in 1988, after extensive study on changes in vehicles technical parameters with testing of different trucks and articulated vehicles combinations at various locations across country, the provinces endorsed the first Memorandum of Understanding on interprovincial vehicle weights and dimensions. The MOU was amended in 1991 and 1994 to add more types of vehicles. It was estimated that in the first years, the net savings of freight road transport from harmonized of the vehicles' dimensions were CAD180 to 300 million annually for the part of the national highway system covered by the MOU³.

In a USA study for harmonization of trucks dimensions and weights in North Dakota with the standards of the Western States Transportation Alliance⁴, it was estimated that the state's trucking industry might gain USD140 million to USD285 million per year⁵. In the same time, the study pointed out that, the benefits would be spread unequally between the trucking directions.

Both examples show that benefits are greater the wider is area at which standards are harmonized. North Dakota's study noted since not all of the states bordering with North Dakota have the same standards as the Alliance (Minnesota standards are lower) than the trucking directions would benefit unequally based on whether they connect to the area with the harmonized standards. There are some interdependencies between

¹ T.R. Lakshmanan, Uma Subramanian, and Wil Anderson, *Integration of Transport and Trade Facilitation: Selected Regional Case Studies (English)*. (Washington, D.C.: The World Bank) <<http://documents.worldbank.org/curated/en/228791468766191047/Integration-of-transport-and-trade-facilitation-selected-regional-case-studies>>.

² Russian transport operator reported such cases while moving cargos from the Russian Federation across Belarus during the period of seasonal decrease in axle load limits in Belarus. (OOO "TransAvtoCisterna"<<http://xn--80aaahpr6aegphgefgd9d.xn--p1ai/press-centr/stati/2792/31464/>>)

³ Council of Ministers Responsible for Transportation and Highway Safety, *Harmonization of Transportation Policies and Regulations: Context, Progress and Initiatives in the Motor Carrier Sector*, June 2008 <<http://www.comt.ca/english/coff-report.pdf>> [accessed 15 February 2018].

⁴ States of USA (Alaska, Arizona, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, Utah and Wyoming) that are parties to the Multistate Highway Transportation Agreement that promotes coordination between the signatories in regards road vehicles dimensions and weights.

⁵ *North Dakota Truck Harmonization Study – Final Draft Report* (NDSU Upper Great Plains Transportation Institute, 12 December 2016), p. 173 <<https://www.ugpti.org/downloads/truck-harmonization/2017-01-Truck-Harmonization-Study-Final-Report.pdf>> [accessed 7 April 2018].

the territories in term of process of adopting and applying the harmonized regulations. Thus, in the process of harmonization of vehicle regulations in Canada, the provinces depended on each other to changes regulations (Quebec could change regulations after the Ontario changed its¹).

In case, where countries set lower limits for the size and weight truck than neighbours, they are guided by a number of serious and viable concerns.

First, it is the state of the road infrastructure and maintenance needs. Heavy freight vehicles with weight above capacity of road, bridge or other infrastructure increase deterioration rate and maintenance costs for the roads and infrastructure, pose safety risks in mixed traffic and might push upward accidents related costs. On the other hand, if a road is included in the AH network, that means that as an ultimate goal it will be brought up to standards of one of the Classes (preferably, Class II and above) set for the network if it has not been done already. If the limits are set lower than the road standard allows accommodating, bigger number of smaller trucks or trips is needed to carry the same volume of freight. Therefore, in case bigger vehicles are available and infrastructure of needed capacity is in place, the low limits might cause more impact of environment, higher consumption of fuel while the situation allows avoiding these consequences.

Second concern is road safety when it comes to heavy vehicles and vehicles combinations. Time to stop the longer vehicle, time for them to start moving at streetlights, time needed to pass a point, turning radii they need at the road, space at the parking lots and rest centres as well as and design of access to them, space and facilities at the logistics terminals they need, – all are the aspects to be taken into the account. Having the common standards on weights and dimensions of the freight road vehicles along the AH network would allow to elaborate coordinated measures to tackle these issues and share the best practices among countries. In the same time, those common practices (similar times at the street lights, as a small example) would make the road more predictable for drivers and thus safer for all.

Harmonization of the standards on freight road vehicles across the AH network would help in developing measures to address those concerns as well as benefit regional trucking industry and possibly wider economy. It would be essential contribution to the transport and transit facilitation in Asia along with streamlining switches between areas with right- and left-hand traffic, making the information on legislation in regards the vehicles standard available and easily accessible, providing dual language road signs and signals, markings (English and national language), training for drivers, etc. Effect of harmonization might be enhanced and extended by building the regional system of weighbridges long the roads – parts of the Asian Highways with the certificates issued by these weighbridge stations recognized by relevant authorities of the countries – parties to the AH agreement. Harmonized regulations on vehicles and dimensions would allow seamless international road transport across Asia, optimization of related costs, would provide more opportunities for trade and create new stimuli for development. The benefits, their size and area covered would depend on how many ESCAP members apply the harmonized standards.

II.3 Enforcement mechanisms for the standards on weights and dimensions of freight road vehicles: examples from ESCAP region

Enforcement of the regulations on weight and dimensions of freight road vehicles is complex task that is aimed not only at penalizing the non-compliance but on prevention of future breaches and infringements. It includes aspects of measuring and weighing the vehicles, identification of the responsible for the breaches, competent authorities for overseeing the regulations and compliance to them. Practices of ESCAP countries are diverse in all of these aspects.

Weight of vehicles is controlled with the help of static weighing at the weighbridges along the road and with the help of the weigh-in-motion technologies. The first method is commonly accepted practice; the latter is being more and more widely used. For instance, in the Republic of Korea, both methods are used: the vehicles pass over the weigh-in-motion devices at, for instance, the road tolls and then, if excess of the weight is detected, are directed to a weighbridge for double-checking and more precise measurement². In India, the installation of the weigh-in-motion devices is planned as part of campaign to curb truck overloading in the country. Dimensions of trucks might be measured with measurement tools, automatic measurement systems or sensors.

If the breach of the regulations on vehicles' dimensions and weights is detected, in most ESCAP region the responsibility might be borne by the driver of the vehicle, its owner, or transport operator. Below are some

¹ National Academies of Sciences, Engineering, and Medicine, *Review of Canadian Experience with the Regulation of Large Commercial Motor Vehicles* (Washington, D.C.: The National Academies Press, 2010).

² Information from the Korea Expressway Corporation during the project meeting on March 15, 2018.

examples from the countries along AH network. They might be compared with a more holistic approach is being rolled out in Australia (Box 2).

Box 2 Chain of Responsibility in heavy vehicle national law and regulations in Australia

To ensure safety of the heavy road vehicles operations, Australia developed the scheme of shared responsibility for violations of the Heavy Vehicle National Law. Acknowledging that issues with loading, dimensions of vehicles, drivers' fatigue and others may be caused not only by actions of a driver or an operator but by other participants of the supply chain, legislators introduced in 2005 the scheme, called "Chain of Responsibility".

This Chain of Responsibility includes:

- employers and company management,
- contractors of drivers,
- operators of vehicles,
- shippers, consignors, consignees, recipients of shipments,
- loaders and unloaders of goods, loading managers
- schedulers.

Both entities (companies, associations, etc.) and people involved, regardless whether they were actually driving or operating the vehicle, are legally accountable for breaches and infringements. The legal actions applied range from warnings to fines and penalties.

By spreading the responsibility up to shippers and receivers of the goods and applying the penalties to the benefits obtained by the violations of regulations (overloading of vehicles, for example), Chain of Responsibility provisions demotivate coercion of drivers into the offences and encourage better control over the compliance to the vehicles regulations across the supply chain.

Source: National Heavy Vehicle Regulator, Australia, <<https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility>>.

China maintains a "black list" of freight vehicles, drivers, transport operators and cargo shippers. One infringement is enough to get into the list and after the third infringement backlisted person's faces consequences such as lowering of the credit score. Oversized or overweight indivisible cargo may be moved along the conventional roads under a single trip permit. Overloaded or oversized road vehicles are strictly forbidden on the high-speed roads; thus, the measuring takes place at the road tolls to prevent such vehicle from entering the highway. Detected oversized or overloaded vehicles are towed to the impoundment lots where they stay until the infringement is eliminated by the responsible party (cargo is divided or permit to carry oversized indivisible cargo is obtained). There is no fee for the measurement of the vehicles, their towage to the impoundment lot and their parking there. Information on the details of the infringement is gathered by the traffic police and the related authorities of the point where it was detected and then is transferred to the road authorities of the place of the vehicle is registered for enforcement. Single infringement is fined¹. If the number of infringements is more than three within one year then the vehicle's operation certificate is revoked, the driver is forbidden to undertake commercial transport operation. If within a year 10% of road vehicles of a road transport operator are detected overloaded or oversized, the business of the operator is suspended until the practice is corrected, in serious cases, the business license is revoked².

In India, the driver may be disqualified from driving for overloading vehicles³. The overloading is fined and in case the transport operator is responsible for overloading, both staff in charge and the operator are deemed liable for the offence⁴. In addition to the fine, the excess load should be un-loaded at the cost of the driver or owner of the vehicle before the vehicle is cleared for continuing the trip⁵.

¹ 'Regulation on Road Circulation of the Oversized and Overloaded Vehicles (Order of the Ministry of Transport of the People's Republic of China No 62, 2016)'.

² 'Order of the State Council of the People's Republic of China No 593 "Regulations on Protection of the Safety of Roads", 2011'.

³ 'The Central Motor Vehicles Rules, India, 1989'.

⁴ 'The Motor Vehicles Act, India, 1988'.

⁵ Ministry of Road Transport & Highways, Government of India, 'Breif Note on Overloading and Action Taken/Proposed by Ministry of Road Transport&Highways' <<http://morth.nic.in/showfile.asp?lid=830>> [accessed 27 March 2018].

In the Russian Federation the damage to the roads caused by an overloaded vehicle is compensated by the vehicle owner and is paid upon issuance of the permit to carry the indivisible heavy cargo. The size of the payment depends on the degree of overloading in terms of gross vehicle weight and axle loads, category of the road (federal, provincial, etc.), length of the sections travelled and yearly recalculated coefficient based on deflator index on investments in fixed assets (in road construction and maintenance)¹. Starting 2015, the payment for usage of roads by trucks with permitted weights above 12 tonnes is gathered via Platon Electronic Toll Collection system² based on information from on-board registration devices or the trip road-maps. The system follows pre-paid single trip permit principle, however, under some conditions, operators might be eligible for post-trip payment option.

In case the overloaded or oversized vehicle is detected on the road in the Russian Federation without the special permit or the load/dimensions exceed the amount allowed by the permit, then the penalty is paid by the driver. If the violation is detected by photo or video cameras, then the vehicle owner is fined. The size of the penalty depends on status of the driver/owner: are they an employee, an official or a legal person. In case of serious overloading or excess of size limits, the vehicle might be transported to the impoundment lot until the penalty is paid and measures are taken to reduce overloading or to get the special permit³.

¹ 'Decree of the Government of the Russian Federation No 934 from 16 November 2009 "On Compensation of the Damage Caused by the Transportation Vehicles Carrying the Heavy Weight Cargos along the Roads of the Russian Federation" as Amended in 2011, 2014.'

² Platon Electronic Toll Collection (ETC) system <<http://platon.ru>>.

³ 'Administrative Violations Code of the Russian Federation No 195-Φ3 from 30.12.2001, Latest Amended 07.03.2018'.