NATIONAL ACADEMY OF INDIAN RAILWAYS

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# Trans Asian Railway Network and Connectivity

# TAR: Its Genesis, Contours, Infirmities and Prospects

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NAIR, Vadodara on 27 September 2016

As a Minister of British government, A. Bevin yearned, “let me go to railway station Victoria, buy a ticket, to go anywhere I damn well want to go anywhere in Europe”.

- The yearning in a way reflects a universal desire for people to experience the urge of rail travel, more so across countries and continents.
- **An old dream:** Ever since the inception of railways, engineers and administrators have talked of linking Europe with India by rail.

India’s **Viceroy Dalhousie** is known to have contemplated an extension of the rail line from Calcutta to Singapore and Bangkok at the initial stage of railway construction in India.

- Engineers William Low and George Thomas, two years after the Pacific Railroad in the US had been built, proposed to the British Prime Minister William Gladstone in 1871 the construction of a 9,500 km railway connecting London with Karachi and Mumbai via Trieste, Istanbul, Aleppo and Baghdad.
- About 1,700 km of railways had been built through Europe and the engineering duo believed the route could be completed at a cost around GBP 24 million.

Today, there is a new awareness of railways as an energy-efficient and environment-friendly mode in a world under the spectre of cataclysmic climate change.

# TAR: *Raison d' etre*

The Trans-Asian Railway Network Inter-governmental Agreement formally came into force on 11 June 2009.

- The network was seen as a way to facilitate the huge prospective increases in international trade, with its primary aims
  - to provide a continuous, cost effective 14,000 km rail link between Asia and Europe
  - as well as to improve the economies and accessibility of landlocked countries like Laos, Afghanistan, Mongolia, and the Central Asian Republics.
- Twelve of the world's 30 landlocked countries are located on the Asian continent with the nearest ports in some cases thousands of kilometre away.
- The TAR link offered the potential to greatly shorten the distances and reduce transit times between countries and regions.

# Four major components

- **The Northern corridor** (northeast Asia to Western Europe) connecting the rail networks of China, Mongolia, the Russian Federation, and the Korean Peninsula.
- **The Southern corridor** would run from Europe to Southeast Asia, connecting Turkey, Iran, Pakistan, India, Bangladesh, Myanmar, and Thailand, with links to China's Yunnan Province and, via Malaysia, to Singapore/Indonesia.
- **Sub-regional network**, covering the ASEAN and Indo-China sub-regions; and
- **North-South corridor**, linking northern Europe to the Persian Gulf through the Russian Federation, Central Asia and the Caucasus region.
  - The main route starts in Helsinki, and continues through Russia to the Caspian Sea, where it splits into three routes:
  - A western route through Azerbaijan, Armenia, and western Iran;
  - A central route across the Caspian Sea to Iran via ferry; and
  - An eastern route through Kazakhstan, Uzbekistan and Turkmenistan to eastern Iran. The routes converge in the Iranian capital of Tehran and continue to the Iranian port of Bandar Abbas.

# Sub-region-wise rail network

| | | |
|---|---|---|
| **Southeast Asia** | Cambodia, Indonesia, Malaysia, Myanmar, Singapore, Thailand, Viet Nam | 12,600 km |
| **Northeast Asia** | China, Democratic People's Republic of Korea, Mongolia, Republic of Korea, Russian Federation | 32,500 km |
| **Central Asia and Caucasus** | Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan | 13,200 km |
| **South Asia, Iran and Turkey** | Bangladesh, India, Islamic Republic of Iran, Pakistan, Sri Lanka, Turkey | 22,600 km |
| **Total** | | 80,900 km |

**Problems of standards and discontinuities**

- Some salient standards to consider would include:
- Railway electrification - 25 kV AC, the world standard for long distance and heavy-duty construction since the 1950s;
- Couplings - buffers & chains, Alliance, or SA2. Some dual fitment or transition couplings are possible;
- Brakes - air, with or without electronically controlled pneumatic brakes (ECP);
- Signalling systems - where signals are electronic, not physically visible, and must be 'read' by equipment in the locomotives, or where the train must interact in different ways with the infrastructure.
- Two critical aspects merit special attention:
  - break-of-gauge points, and
  - missing links.
- A break-of-gauge occurs when the railways of neighbouring countries have different track gauges. Different rail gauges are currently in use across the continents.

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# Sub-region-wise rail network

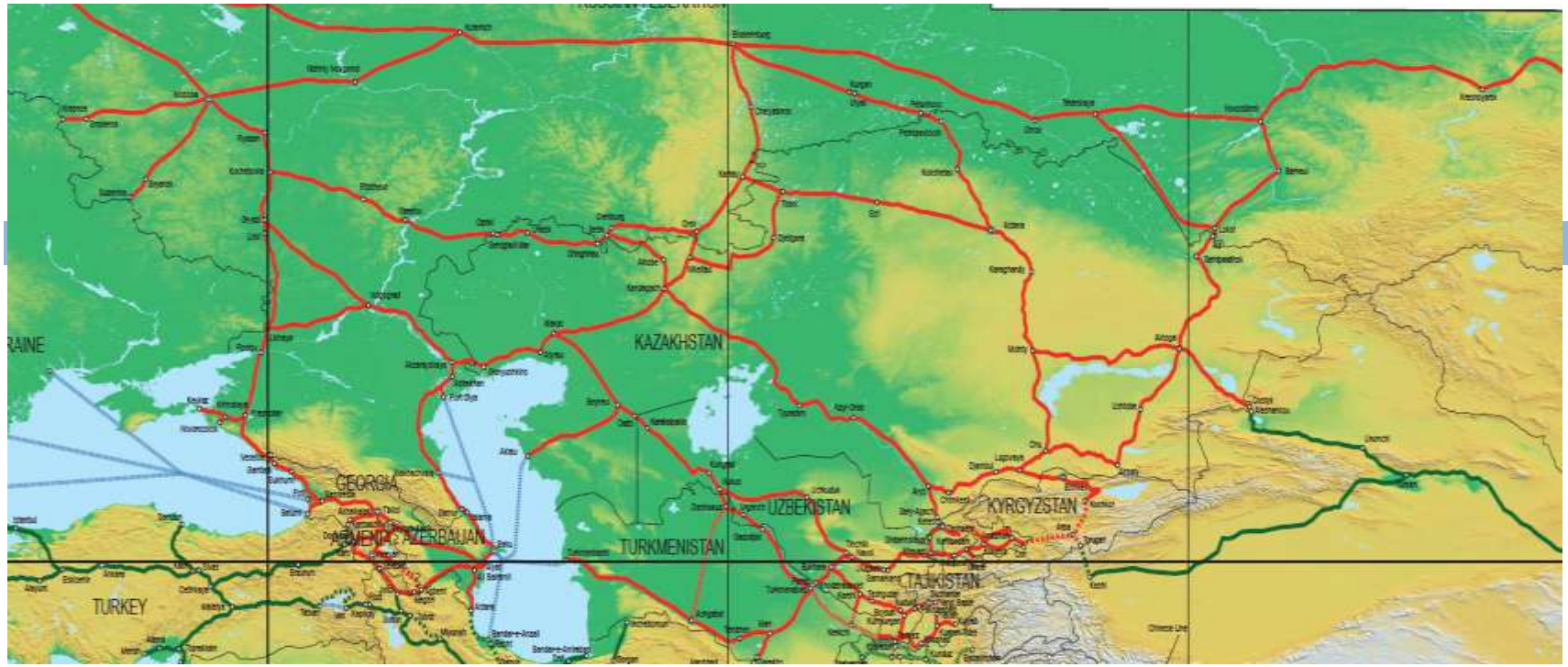
| Missing Links and Spur Links | | |
|---|---|---|
| Poipet-Sisophon | Cambodia | 48 |
| Phnom Penh-Loc Ninh | Cambodia | 286 |
| Loc Ninh-Ho Chi Minh City | Viet Nam | 149 |
| Ho Chi Minh-Vung Tau | Viet Nam | 75 |
| Three Pagodas Pass-Thanbyuzayat | Thailand-Myanmar | 110 |
| Nam Tok-Three Pagodas Pass | Thailand | 153 |
| Vientiane-Thakkek-Mu Da | Lao PDR | 466 |
| Mu Da-Tan Ap | Viet Nam | 53 |
| Source: Feasibility Study for the Singapore-Kunming Rail Link: ASEAN | | |

| | Break of Gauge | | Gauge transition |
|---|---|---|---|
| China | ⇔ | Viet Nam | 1 435 mm ⇔ 1 000 mm |
| China | ⇔ | Russian Federation | 1 435 mm ⇔ 1 520 mm |
| China | ⇔ | Kazakhstan | 1 435 mm ⇔ 1 520 mm |
| China | ⇔ | Mongolia | 1 435 mm ⇔ 1 520 mm |
| Russian Federation | ⇔ | Democratic People's Republic of Korea | 1 520 mm ⇔ 1 435 mm |
| Turkmenistan | ⇔ | Iran (Islamic Republic of) | 1 520 mm ⇔ 1 435 mm |
| Azerbaijan | ⇔ | Iran (Islamic Republic of) | 1 520 mm ⇔ 1 435 mm |
| Armenia | ⇔ | Turkey | 1 520 mm ⇔ 1 435 mm |

- Various techniques exist to overcome the differences in track gauge: e.g., transhipment (manual or mechanical), bogie exchange, and the use of variable gauge bogies.

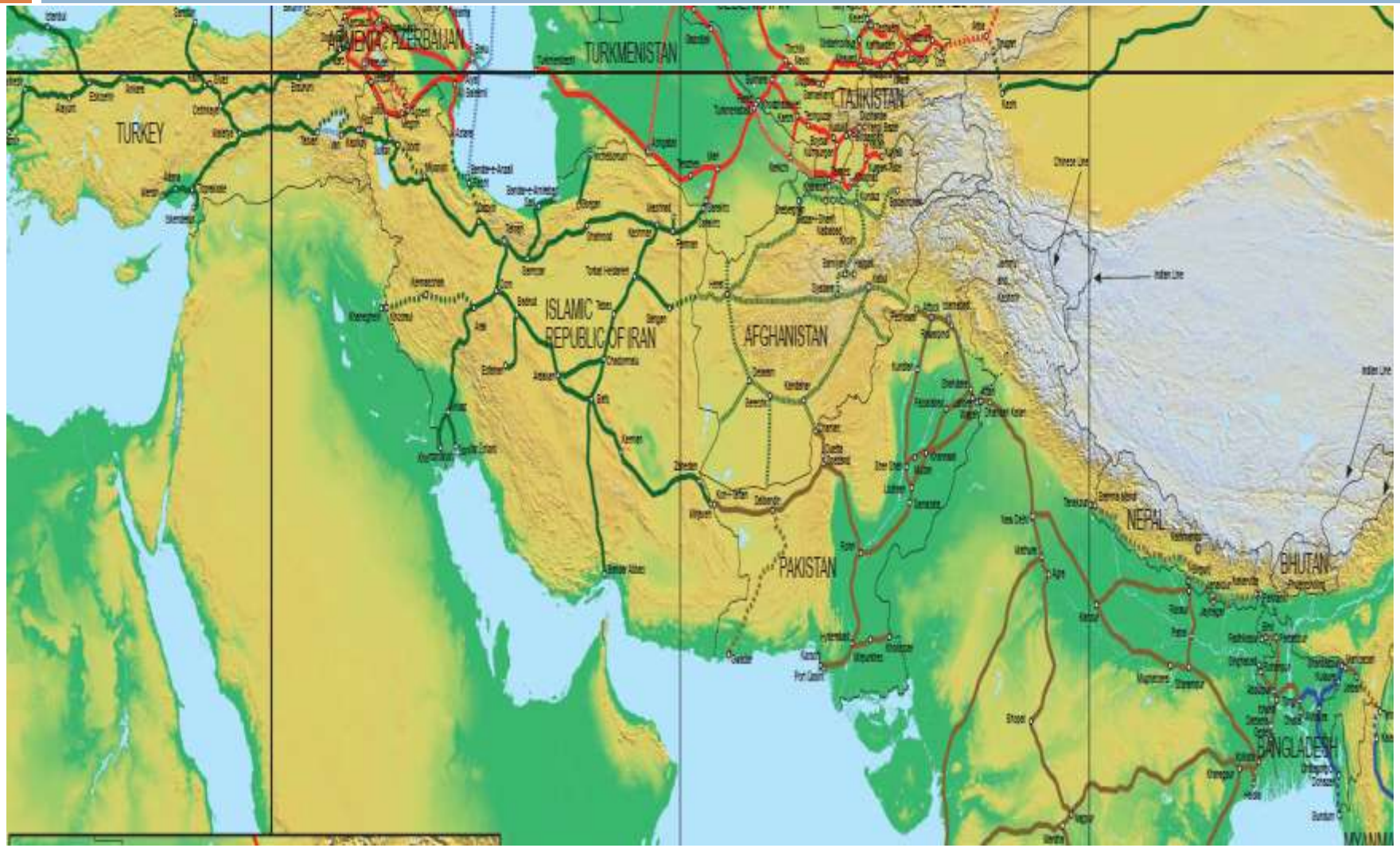
# TAR: Northern Corridor

- The Northern corridor within China itself entails routes relevant to border crossing trade, namely,
  - Lianyungang or Qingdao port to Alashenko (border between China and Kazakhstan);
  - Tianjin port to Erenhot (border between China and Mongolia);
  - Dalian port to Manzhouli (border between China and the Russian Federation);
  - Border with Democratic People's Republic of Korea (DPRK) at Namyang to Manzhouli; and
  - Border with DPRK at Dandong to Beijing.
  - The bilateral and transit trade between Mongolia and China is interchanged at Zamyn Uud on the border with Inner Mongolia, about 710 km by rail south of Ulaan Baatar.
- Another long-planned link between China and Central Asia is the 268 km route from Kashi in western China over the Torugart pass and through southern Kyrgyzstan to Andizhan in Uzbekistan.
- The north-south railways, under construction on both sides of the Caspian, would eventually provide links from Kazakhstan to Iran via Turkmenistan and from Russia to Iran via Azerbaijan.
- The 686 km eastern corridor project (70km of line in Iran, 470 km in Turkmenistan and 146 km in Kazakhstan), launched in 2007, would link Gorgan in Iran with Uzen in Kazakhstan via Gyzylgaya, Bereket and Etrek.




- **The Northern corridor** links Europe and the Pacific, via Germany, Poland, Belarus, Russia, Kazakhstan, Mongolia, China, and the Koreas.
  - The 9,250 km Trans-Siberian Railway (TSR) covers much of this route and currently carries large amounts of freight from East Asia to Moscow and on to the rest of Europe.
  - The TSR network and the other between China and Kazakhstan are both connected to Western Europe.
- Due to political problems with North Korea, freight from South Korea is currently shipped by sea to the port of Vladivostok to access the route.
- The land route is approximately 12,000 km between the Baltic and Northeast Asia vs about 20,000 km by sea, with Kazakhstan virtually at the centre.
- The China land-bridge starting from China and passing Central Asia to Europe would compete with the Siberian land-bridge for traffic between East Asia and Central Asia/Europe.
- The Korean Peninsula West Corridor links Busan with Shenyang in China via Seoul, Pyongyang, and Sinuiju in North Korea and Dandong in China.

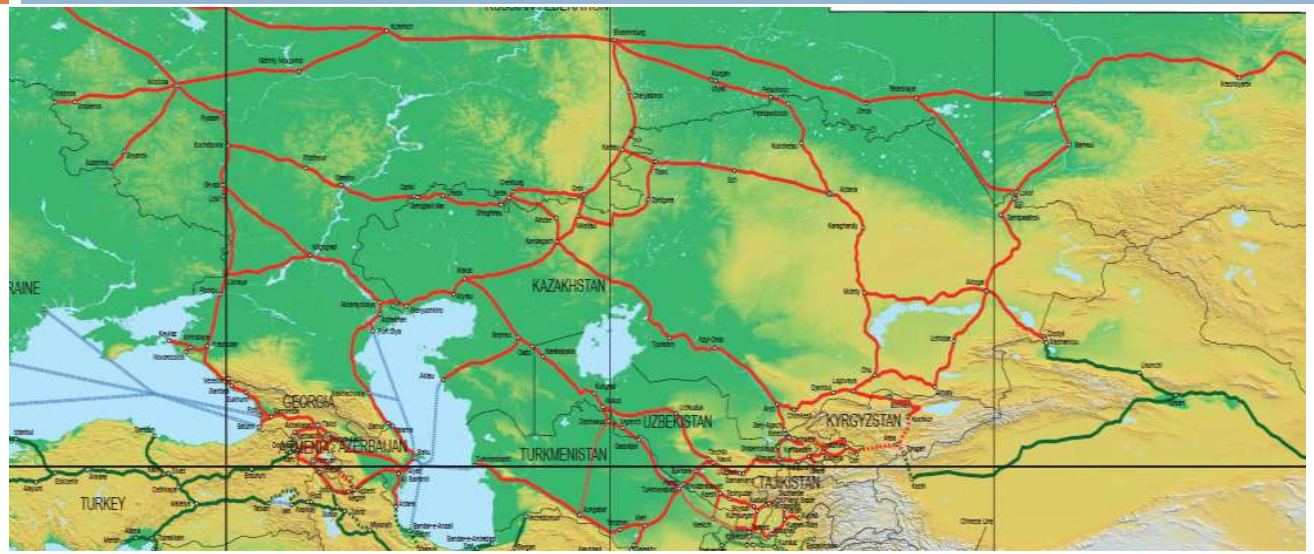
# TAR: Southern Corridor




*Source: UNESCAP*

- **The Southern corridor** would run from Europe to Southeast Asia, connecting Turkey, Iran, Pakistan, India, Bangladesh, Myanmar, and Thailand, with links to China's Yunnan Province and, via Malaysia, to Singapore/Indonesia.
  - During 1995, ESCAP undertook a preliminary study of route requirements for a TAR Southern corridor, with participation of railways of Bangladesh, India, Iran, Pakistan and Sri Lanka.
  - Three routes of international significance were identified, designated TAR-S1, TAR-S2, and TAR-S3.
  - Route TAR-S1 would commence in Kunming (China), running southwest from the existing Chinese railhead at Xiaguan (near Dali) to the border with Myanmar at Ruili, thence to the existing railhead of Lashio in Myanmar and along, what is currently a branch line, to Mandalay.
  - From Mandalay, it would broadly follow an east-west axis, crossing the territory of Myanmar, India (twice), Bangladesh, Pakistan, Iran, as far as the border between Turkey and Bulgaria, at Kapikule.
- From its western extremity it would allow access to Western Europe via Bulgaria, Romania, Hungary and Austria.
- From Kunming to Kapikule, it would have a total length of 11,700 km of which 9,790 km (or 84%) is in place, 95 km (1%) comprises ferry links, and 1,820 km (15%) would need to be constructed.
- From the border between Turkey and Bulgaria, Frankfurt (Germany) is another 1,785 km by rail, giving a total distance between Kunming and Frankfurt of approximately 13,500 km.
- Between its eastern and western extremities, TAR-S1 would cross as many as seven national borders (with another five to be crossed west of Turkey) and would contain three different track gauges - metre (1,000 mm), standard (1,435 mm) and broad (1,676 mm).

# The two main corridors: some pros and cons

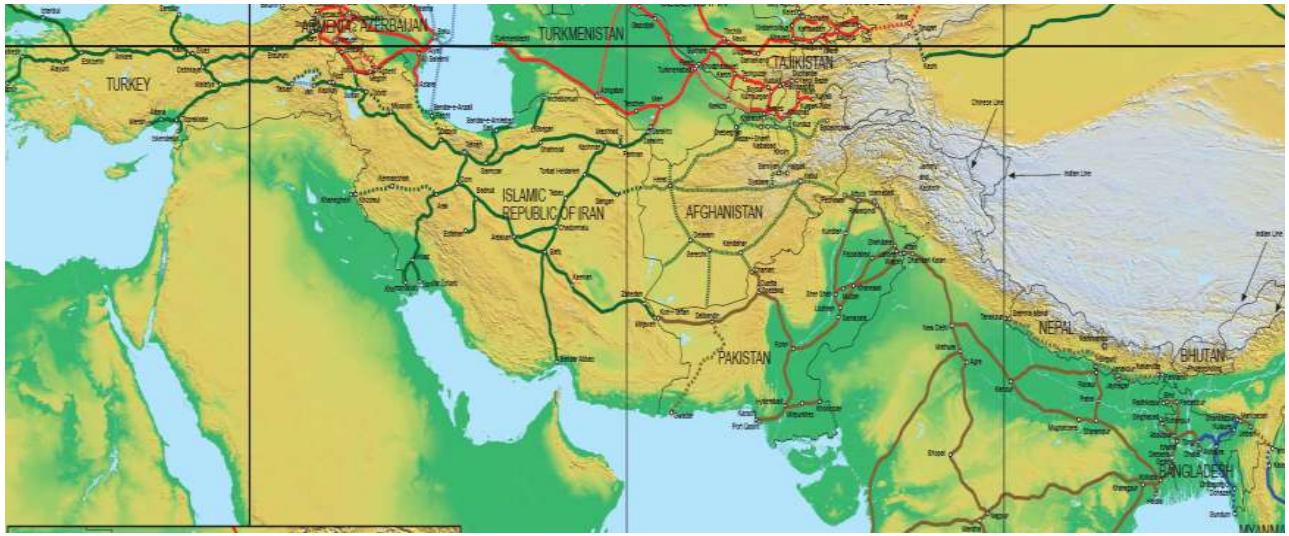



**Trans Asian Railway: Northern Corridor**

*Source: UNESCAP*

**Trans Asian Railway: Southern Corridor**

*Source: UNESCAP*



For Kunming-Europe rail freight movement, the route via north-western China, Kazakhstan, the Russian Federation and Belarus (effectively the TAR Northern corridor) would result in overall journeys up to 2,100 km shorter than via TAR-S1.

- The former route could save more than three days in transit time as compared with the Southern corridor , not including additional border crossing dwell time resulting from the need (between Kunming and Europe) to cross seven national borders in the case of TAR-S1, as compared with only three for the alternate route.
- In addition, use of TAR-S1, once it is continuous, could involve passing through seven break-of-gauge points, as compared with only two in the case of the routes via Chengdu or Chongqing, Kazakhstan, Russia and Belarus.
- The north-western China/TAR Northern corridor might save more than seven days in transit time overall as compared with TAR-S1.
- For freight movement between Kunming and the northern part of Iran, taking Tehran as a representative destination, the Southern corridor has a slight distance advantage over the route through north-western China and the Central Asian Republics.
  - This advantage is likely to be eroded by the slower average speeds likely to be achieved, and by the additional dwell time at border and break-of-gauge stations.

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- Between Kunming and Tehran, the number of border crossings would be six and the number of breaks-of-gauge four, if TAR-S1 were to be used, as compared with only four border crossings and two breaks-of-gauge on the route via north-western China and Central Asia.
- For movements from Bangkok as far as the northern part of Iran (with Tehran as a representative destination), the Southern corridor is likely to have a distinct distance and commercial (i.e. transit time) advantage.
- While the Southern corridor involves fewer breaks-of-gauge than in the case of the link with the Northern corridor (four gauge transfer points between Indo-China and Western Europe via the Northern corridor, as compared with only three via the Southern corridor), completion of the connections with the Southern corridor would involve the construction of missing links totalling at least 1,400 km as compared with only 288 km of missing links on the Northern corridor.
- The Northern corridor has a high level of operational readiness. It would facilitate movement between Central Asia and Europe through the Russian Federation and then on through either Belarus or Ukraine.
  - This was a corridor traditionally used for inter-republic trade in the erstwhile Soviet Union, and also the traditional route for moving cargo between western and central Europe and the former USSR.
  - The railway infrastructure in this corridor is thus extensive and well developed.

# TAR in Bangladesh

- The Southern corridor in India, forming part of the main intercontinental TAR-S1, starts at Gede on the Indian side of Bangladesh's western border and follows the Indian BG east-west trunk line up to the border with Pakistan at Attari.
  - a total BG length of 1,975 km.
- The first such link, Bn.1 forms part of the principal transcontinental route TAR-S1.
  - It starts from the north-eastern Bangladeshi border station of Shahbazpur, opposite Mahishasan in the southern part of Assam in India.
  - From Shahbazpur, link Bn.1 follows the existing Bangladeshi MG branch line in a south-westerly direction to the junction with the mainline to Sylhet at Kulaura, thence the MG mainline via Akhaura and Bhairab Bazar to Tongi, to which Dhaka is connected by a 22 km double-tracked MG line.
  - From Tongi, this link runs north to Joydebpur, from where a dual gauge (1000/1676 mm) line connects the new Jamuna Bridge (opened 23 June 1998) via Tangail, providing a continuous rail link with Jamtoil, 15 km southwest of Serajganj Ghat, the existing BG railhead on the western bank of the river.

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- From Jamtoil, the route follows the existing BG line to the border with India at Darsana (opposite the Indian border station of Gede).
  - A 321 km second link, Bn.2, connects Dhaka, northern Bangladesh and north-eastern India with the port of Chittagong. Between Tongi and Akhaura (98 km), it shares the alignment of Link Bn.1.
  - A third link, designated Bn.2a, is an extension of Bn.2 which terminates at Chittagong.
- Link Bn.2a has been proposed by the Bangladesh Railways for connecting with the central part of Myanmar via a border crossing inland from Teknaf.
  - This link would have a length of 192 km, of which 47 km is in place and 145 km would be new construction.
  - Initially, this link runs southeast from Chittagong to Dohazari before turning south to the Bangladesh-Myanmar border.
- Link Bn.3 (Ishurdi-Birol) is an MG line connected to the border with India through the stations of Birol (Bangladesh) and Radhikapur (India).
  - It forms part of a rail and road transit route allowing the flow of Nepal's third country trade on the India-Nepal border at Jogbani (India)/Biratnagar (Nepal) and the Bangladeshi ports of Chittagong and Mongla.
- An alternative rail transit route between Nepal and Bangladesh is available through the Indian border station of Singhabad, opposite Rohanpur in Bangladesh.
  - This route, connecting with the India-Nepal border at Raxaul (India)/Birgunj (Nepal), has the advantage of being entirely BG between Raxaul and Khulna in Bangladesh, where rail to road or rail to barge transfer would occur, for onward movement to Mongla.

# TAR in Myanmar

- TAR in Myanmar has a significant role in the development of the Southern corridor, since it would provide the necessary linkages between the railway networks of China and Southeast Asia, on the one hand, and South Asia, on the other.
- There is currently no connection between the railway systems of Thailand and Myanmar.
- The westernmost railhead in Thailand is located at Nam Tok, some 77 km west of Kanchanaburi and 210 km west of Bangkok.
- Route TAR-S2 would start from Nam Tok and proceed in north-westerly direction to the border with Myanmar at Three Pagoda Pass, a distance of 153 km.
- From there, it would traverse a further 110 km to Thanbyuzayat, a major station on the isolated Mawlamyaing (Moulmein) Ye line of the Myanmar Railway.
- An alignment survey of a rail link between Nam Tok in Thailand and Thanbyuzayat in Myanmar, via the border checkpoint at Three Pagoda Pass, has been carried out.
- From Thanbyuzayat, TAR-S2 would run north on the southern bank of the Thanlwin (Salween) river, a distance of 70 km, and cross a 4 km ferry in order to reach the railhead on the northern bank at Moktama (Martaban).
- From Moktama, it would follow the existing line to Bago, a distance of 196 km, and from there to the junction with TAR-S1 at Mandalay, a further 545 km.
- The total length of TAR-S2 via Three Pagoda Pass would be 1,078 km, of which 811 km (or 75%) is in place, 4 km is a ferry link, and 263 km (25%) would need to be constructed anew.
- Intercontinental rail traffic using Route TAR-S2 would travel a total distance of 11,460 km between Bangkok and Kapikule and 13,240 km between Bangkok and Frankfurt.
- This route would cross seven national borders, with inter-gauge transfers being required at four locations.

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- All of the link My.1a, from the border with Thailand at Three Pagoda Pass to Thanbyuzayat, a length of 153 km, would represent new construction.
- Link My.2b is a missing link, beginning at Mu-se (opposite Ruili in China) running a length of 232 km south-west through a mountainous terrain to the commercial centre and railhead of Lashio, in north-eastern Myanmar.
- Link My.3, beginning at Mandalay, runs for about 670 km in a westerly direction to the border with India at Tamu.
- Link My.3a would start from the station of Kalay to Gangaw and would follow a northerly alignment for about 135 km up to the border checkpoint at Tamu.
- Link In.5a would start from Tamu, following in a north-westerly direction through Imphal, the capital of Manipur state in India and from there in a westerly direction to Jiribam, which is the existing railhead on the Indian MG network.
- From Jiribam, the existing MG line provides a direct connection with Bangladesh at the Indian border station of Mahishasan (opposite Shahbazpur in Bangladesh), passing through Silchar en route.
  - The distance from Tamu to Mahishasan is about 340 km, of which the missing section comprises about 180 km, nearly all of it requiring construction through a mountainous terrain.

# TAR in China

- In China, the Southern corridor potentially comprises two links:
  - (i) Ch.1 start in Kunming, proceeding in a westerly direction for 365 km to the city of Xiaguan, located some 15 km southeast of the Yunnanese cultural and tourist centre of Dali.
  - From Xiaguan, there is a proposal to construct a new line connecting the existing railhead with the China-Myanmar border.
- This new line, designated Link Ch.1a would run southwest for about 630 km to the border town of Ruili, opposite Mu-se in Myanmar.

# TAR in Pakistan

- TAR Southern corridor in Pakistan runs from the border with India to the border with Iran, following an east-west alignment.
- Spezand is a major junction station, from which a link designated as Pk.2 proceeds north through Quetta, to near the border with Afghanistan at Chaman, while Pk.1 heads west towards the border with Iran.
- Between Spezand and Nokundi, the link passes through sandy plains, before climbing through mountainous terrain to reach the border with Iran at Koh-i-Taftan.
- Link Pk.3 connects Karachi and Qasim ports with the hinterland of Pakistan and Afghanistan. It starts at the junction with Link Pk.1 at Rohri, from there running south to city of Hyderabad and then southwest to Karachi.

# TAR in Iran

- Situated at the crossroads of Asia and Europe, Iran provides an important transit route.
  - A veritable bridge connecting the easternmost ports of the Iranian plateau to the westernmost regions of the Asian continent.
- TAR in Iran, forming part of international route TAR-S1
  - from the border with Pakistan to the border with Turkey, a distance of 2,573 km, from Koh-i-Taftan (Pakistan) crosses the border on the single track BG line, which runs for 92 km in a north-westerly direction as far as the provincial city of Zahedan.
  - This is the only BG line in Iran.

# TAR in Turkey

Turkey is significant as the western extremity of the TAR Southern corridor.

- It is also significant as the connection between the European and Asian continents.
- The Straits of Bosphorus (at the northern end of the Sea of Marmara) and of Dardenelles (at the southern end) form the dividing line between the European and Asian portions of Turkey.
- Currently, the Strait of Bosphorus is spanned by two highway suspension bridges – the Fatih Sultan Mehmet Bridge and the Bosphorus Bridge.
  - The railway networks on either side of the Bosphorus are connected by ferry services with vessels fitted with rail decks.
- This is the main east-west trunk line which forms international route TAR-S1 within Turkey.
  - It runs from the checkpoint on the border with Iran at Kapicöy to the border with Bulgaria at Kapikule, an overall distance of 2,354 km.
- Exchange of traffic with the standard gauge railway system of Turkey occurs at the Turkish border station of Kapicöy, opposite Razi in Iran.
- From Kapiköy, Link Tk.1 proceeds due west through rising terrain to the ferry terminal at Van on the eastern shore of Lake Van.
  - At Van, trains arriving from Kapicöy are dissembled into short rakes for loading onto ferries for the 91 km east-west crossing of Lake Van, which currently takes 4-5 hours.

# TAR in ASEAN

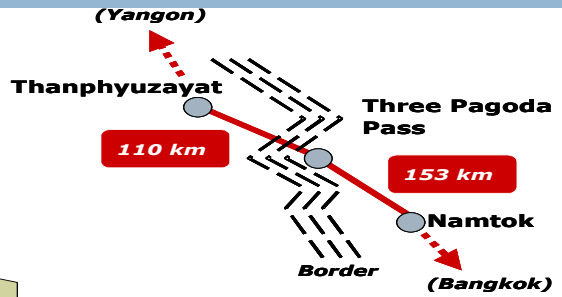
- TAR in the ASEAN sub region is a special case.
  - As its constituent railway systems mostly conform to 1,000 mm or 1,067 mm track gauge standards;
  - Predominantly light track structures;
  - Light axle loads;
  - slow speeds, and;
  - small vehicle profiles.
- It contrasts with the TAR Northern corridor, which has a predominance of 1,520 mm gauge route (1,435 mm in China), heavier track structures, heavy axle loads, generally higher speeds, and larger vehicle profiles.
- The TAR network in the Indo-China and ASEAN sub region is connected to the Northern corridor via southern China linked to the Vietnamese railway system via a dual gauge (1,000 mm/1,435 mm) track extending into the territory of Vietnam as far as Hanoi.
- The rail lines in the south are connected to Malaysia at Padang Besar and Sungai Kolok.
- The link is used for carrying containers between Port Klang in Malaysia and ICD Lad Krabang in Bangkok.
- The Orient Express luxury train also operates between Thailand and Singapore via Malaysia.

# SKRL

Proposed at the Fifth ASEAN Summit in Bangkok in December 1995, the Singapore-Kunming Rail Link. (SKRL) project is the core agenda for action of the ASEAN Mekong Basin Development Cooperation (AMBDC) programme, one of ASEAN's flagship projects, and an integral component of TAR.

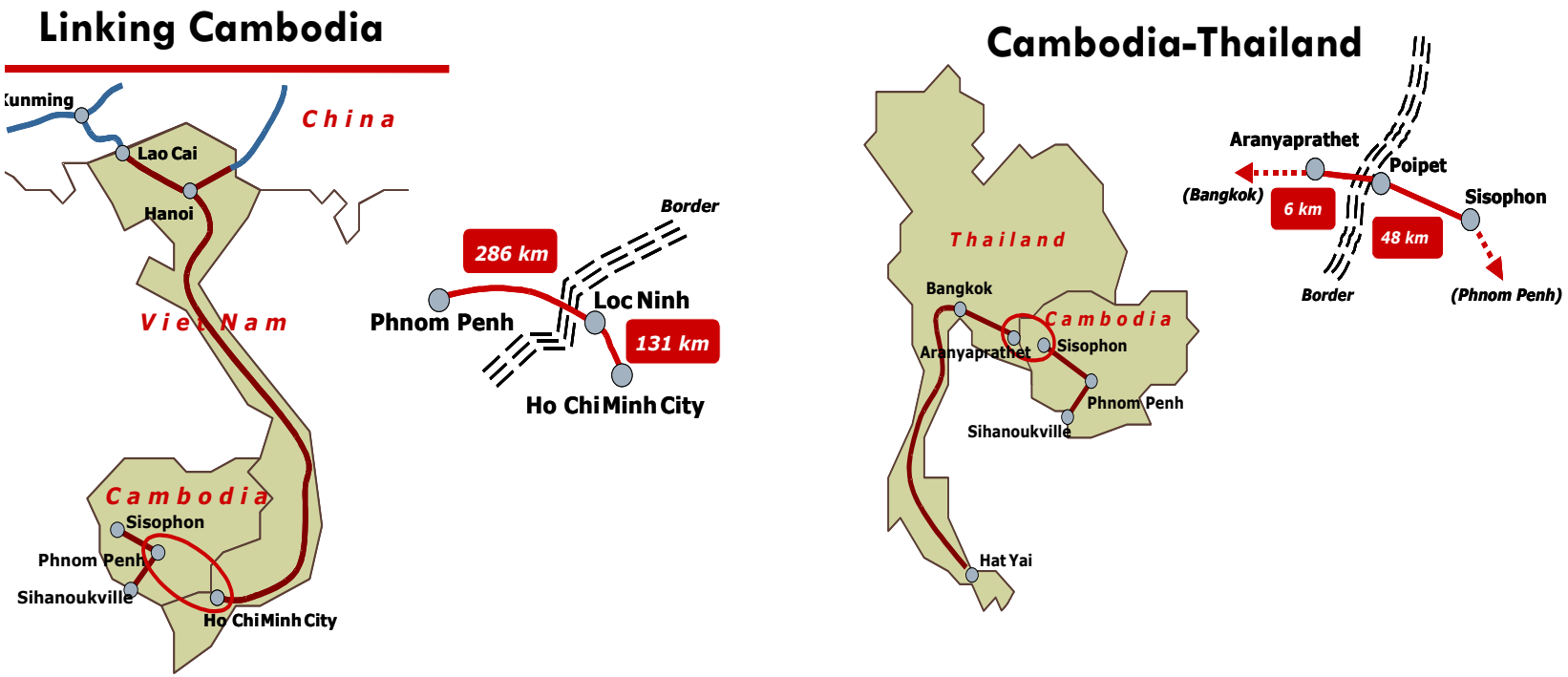
- Involving an investment of about US$ 6.5 bn, China showed interest in speeding up the construction work on its section of the 5,500 km railway link between Kunming, and Singapore, connecting Yunnan with Viet Nam and Laos, with branch line to Myanmar.
- As a SKRL component of TAR project, three sections are relevant in Vietnam:
  - 1,726 km Ho Chi Minh-Hanoi backbone network;
  - 130 km Sai Gon (Ho Chi Minh City)-Loc Ninh missing link (line built in 1933 heavily damaged in war, ceased operation in 1967), to provide connectivity between Vietnam and Cambodia at an estimated cost of US$ 350m; and
  - 119 km Vung Ang-Mu Da-Tan AP spur line to connect port of Vung Ang and extend to Laos.

# Myanmar-Thailand Links


- For the 110 km missing link between Thanbhyuzayat and Three Pagoda Pass on the Thailand-Myanmar corridor, a feasibility study sponsored by the Korea International Cooperation Agency (KOICA) on the spur line connecting Nam Tok-Three Pagoda pass-Thanbhyuzayat (on the Myanmar-Thailand border) was submitted in April 2007. The link was estimated to cost US$246 mn.
- A 164 km rail line from Ye to Dawei on the Thailand-Myanmar corridor has since been built.
- A 350 km long missing link, if constructed, will connect Indian rail network with Myanmar's.
  - Of this, about 150 km falls within India, for which a new rail line has now been proposed to be built between Jiribam and Moreh at a cost of Rs. 2,941 crore (US$ 700 million).
  - The rest – about 200 km rail line – is to be constructed between Tamu (Moreh) – Kalay – Segyi in Myanmar, at a cost of Rs. 1,339 crore (US$ 330 million).
  - For a 135 km Kalay-Tamu missing rail link (within Myanmar) on Myanmar-India corridor, a feasibility report was submitted by RITES in March 2005.

# Linking Cambodia and Thailand




- There is a missing link of 130 km between Ho Chi Minh City in Vietnam and Loc Ninh on the Cambodian border.
  - A feasibility study has been completed; the cost of its construction is estimated at $150 million.
- The Second Survey and Design Institute of China Railway carried out a preliminary technical study on the 286 km missing link from Phnom Penh in Cambodia to Loc Ninh in Vietnam.
  - Its report was submitted in June 2005, with estimated cost of construction $480 million.

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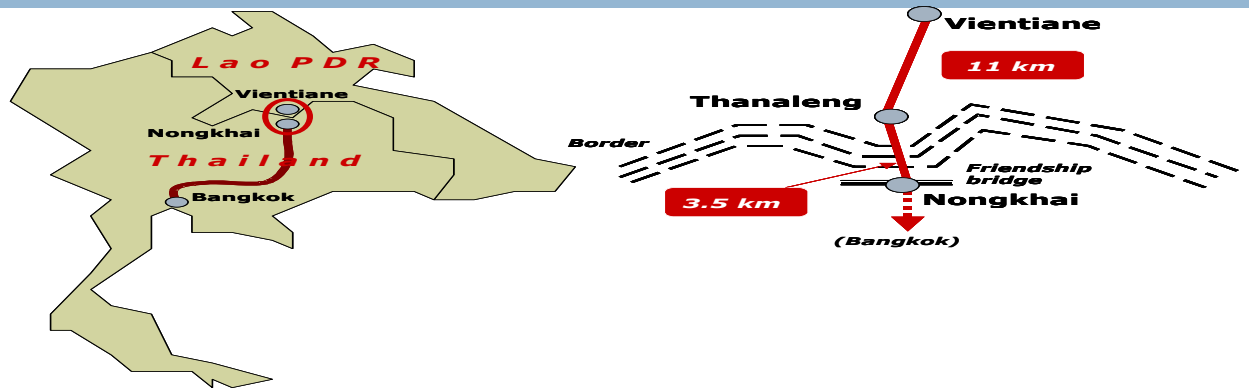
- The Cambodian Royal Railways has two main rail links:
  - 368 km northern line constructed during years 1929-1942 from Phnom Penh to the Thai border at Poipet.
  - A 48 km section Sisophon- Poipet was destroyed during the war;
  - 264 km southern line constructed during 1960-1969 from Phnom Penh to Sihanoukville.
- Cambodia was scheduled to take up the construction of the 48 km Sisophon-Poipet missing link in 2007 at estimated cost of US$73 mn.
  - Malaysian government and KTMB donated used rails of 106 km length for the stretch and its subsequent link to Phnom Penh project.
- The State Railway of Thailand pursued the construction of the 6-km missing link from Aranyaprathet to the border with Cambodia.
- The missing links have been: (i) a 3.5 km stretch across the Friendship Bridge from Nong Khai in Thailand; and (ii) an 11 km link between Thanaleng and Vientiane.
- A feasibility study completed for 6 km Aranyaphathet-Poipet (to connect Cambodia), and 80 km Chiang Rai-Chiang Khong (to connect Laos and Southern China).

# Lao PDR-Thailand




- An important economic corridor, the link connecting Lao PDR's capital city, Vientiane with Bangkok and eastern seaboard in Northeast Thailand had the Thai-Lao Friendship Bridge over the Mekong river constructed between Nong Khai and Vientiane and opened in April 1994. For long, this bridge had been used for road transport only.
- Work to link Laos to Thailand's rail network began on 19 January 2007. The rail line from the Thai side at mid-point of the Friendship Bridge runs on the bridge about 600 metre, and terminates at Ban Thanaleng station.
  - A feasibility study conducted by Korea Railroad Technical Cooperation in 2002 for a 13.6 km rail line from the centre of the Friendship Bridge to Vientiane city – as a part of the 12.5 km Nong Khai Vientiane rail link.
- In phase I, a 3.5 km MG stretch from Nong Khai to Thanaleng over the Friendship Bridge completed in April 2008 at a cost of Baht 18.7 mn (US$600,000).
- For phase II, the 9 km Thanaleng-Vientiene stretch feasibility study completed in August 2008 at a cost of € 250,000 with French assistance.
- For Laos, a 148 km MG line is envisaged for the Khek-mugia project.
  - A feasibility study completed with financial assistance from Government of Vietnam and report submitted on 24 September 2008.
  - Yet another 450 km rail line has been proposed by Laos from Vientiene to Savannakhet in the south.

# Initial container block train trial runs

- UNESCAP and the Organization for Railways Cooperation (OSJD) signed a Memorandum of Understanding in 1999 to promote cooperation and strengthen the impact of their respective work programmes on the development of railway infrastructure and services. The two organisations together promoted a number of demonstration runs of container block trains along the different routes of the TAR northern corridor:
  - in November 2001, between the Chinese port of Tianjin and Ulaanbaatar in Mongolia,
  - in April 2004, between the Chinese port of Lianyungang and Almaty in Kazakhstan,
  - in June 2004, between Ulaanbaatar (Mongolia) and Brest (Belarus), and
  - in July 2004, between Vostochny in the Far East of Russia and Malaszewicze in Poland.

A container block train between Western Europe and the Far East that travels at about 1,000 km per day on average would have at least seven days advantage in transit time as compared to sea transport.

- Another event of significance was the inaugural run of a freight train carrying containers on 14 August 2009 under the auspices of the Economic Cooperation Organisation from Islamabad to Istanbul, with a break-of-gauge at Zahedan (from 1,676 mm to 1,435 mm).
  - The train established that technically it is possible to introduce a train service on the rail route along Istanbul, Turkey to Dhaka, via Indian Railways system with a just one break-of-gauge at Zahedan.

# Challenges

- The TAR network for the entire sub region, with the inclusion of missing and new links, would have an overall route length of 14,320 km, of which metre gauge (1,000 mm) lines would account for 9,436 km (66%), while lines of 1,067 mm, 1,435 mm and mixed 1,000/1,435 mm gauge would account for 2,295, 2,277, and 312 km, respectively.
- For the TAR network, overall it is estimated that building single-track lines on the 13 major missing links over a total of 6,237 km will entail an investment of about $14.6 billion.
- Moreover, a large number of TAR lines would need to be upgraded to double-track lines, requiring large outlays.
  - Additional investment will be required to develop intermodal interfaces, such as inland container depots (dry ports) as well as border-crossing facilities.
- The "software" part of the project involves the next challenge, to move towards joint operationalisation of the corridors in a coordinated manner at financial and commercial levels.
  - Institutional and technical bottlenecks need to be identified and specific remedial measures defined and delineated.
  - The development of common IT platforms and systems would need to be in place, in addition to the development of efficient access to ports and inland container depots.
  - In the longer term, corridor-based organizations may be a clear need with the authority to act on behalf of their constituent railway administrations for activities such as service-definition, tariff-setting and marketing.

# Thank You