5. INFRASTRUCTURE

84 ROADS, RAILROADS, AIRPORTS, PORTS
92 ENERGY SUPPLY
93 HYDROPOWER AND THERMAL POWER PLANT PROJECTS
94 TELECOMMUNICATIONS
95 INFORMATION AND COMMUNICATION TECHNOLOGY | MPT TOWERS
97 INFORMATION AND COMMUNICATION TECHNOLOGY | OOREDOO AND TELENOR TOWERS
Due to the scale and physiography of its major geographical regions, all of Myanmar’s large roads and waterways run to this day on a north-south axis. Until well into the 20th century, the Ayeyarwady River – the ‘Road to Mandalay’, as the poem calls it – and its tributaries formed the only unbroken corridor linking north and south. By comparison, the west-east axes are less developed: due to the topography of Myanmar’s mountain ranges, most of which run north to south, the west-east route poses much greater problems for construction and, for that reason, was hardly developed until comparatively late.

In the pre-colonial era, the road system consisted of local tracks for oxcarts and horse-drawn vehicles, but there was already a network of long-distance overland routes – well-developed for its time – for the transportation of goods across present-day Myanmar and into neighbouring regions. They included the roads connecting China and India with the amber and ruby mines in Mogaung and Mogok, the jade deposits in Kachin and the tin-tungsten mines in Kayah (KTAM Report 1953: 361, Hla Tun Aung 2003: 513-514). A well-developed, good-quality cart track between Mandalay and Taungoo existed in the late 19th century.

**EXPANSION IN COLONIAL TIMES**

After the country’s progressive annexation by the British, modern roads and railway lines were constructed, mainly to support the extraction and transportation of natural resources. In 1881, the country had around 1,421 km of roads, just 499 km of them metalled, but road-building progressed rapidly thereafter: by 1891, there were more than 4,614 km in Lower and 4,672 km in Upper Burma, of which 1,540 km and 320 km, respectively, were metalled (Hla Tun Aung 2003: 515). However, it was not the roads but the railways which were crucial for the transportation of goods and people in the British colonial period: ‘Prior to the war, Burma Railways carried from 80 to 90% of the freight and practically all passengers’ (KTAM Report 1953: 256). The 260 km railroad from Rangoon to Prome opened in 1877, followed by a 620 km rail link from Rangoon to Mandalay in 1889. By 1903, the rail network had been extended to 2,113 km, with connections to Myingyan, Myitkyina, Alon, Lashio and Bassein-Letpadan, and by the Second World War, it had increased to 3,312 km. The Ava Bridge near Sagaing, built in 1934, was the first to span the Irrawaddy (KTAM Report 1953: 256, Storz 1967: 149). The British also drove the large-scale development of the Irrawaddy Delta as the ‘rice bowl’ for British India. Although this relied in part on the construction of roads and a railway line from Rangoon to Henzada and onward to Bassein, the country’s dense network of small ports and docks played a key role, increasing the volume of shipping along the rivers, channels and canals.

By the beginning of the Second World War, the British had built 10,961 km of paved roads suitable for year-round use and a further 9,030 km of earth and gravel roads which were passable only in the dry season (Hla Tun Aung 2003: 515). As the Second World War wore on, the US Army constructed the strategically important Ledo (later Stilwell) Road from Myitkyina via Mogaung to the Pangsau Pass. The route to India was also upgraded and extended with the construction of the Kalewa-Tamu Road. The Burma Road from Mandalay via Hsipaw and Lashio to Muse improved the transport link to China, and the highway from Kengtung to Tachileik was extended as far as
RECONSTRUCTION AND A NEW START DURING THE EARLY YEARS OF INDEPENDENCE

The legacy of war, along with unrest and insurgency during the post-war years, brought rail transport to a virtual standstill and inflicted serious damage on the road network. This began when numerous road and rail bridges and much of the rolling stock were destroyed by the British Army as it retreated from the advancing Japanese; in subsequent years, all the warring parties engaged in defensive and aggressive action and thus had a hand at various times in systematically destroying the country’s transport systems, which were seen as targets for ground operations and aerial bombardments (Storz 1967: 139, 149; Allen 1984, McCormack/Nelson 1993, Nesbit 2009). In 1940, the country had 3,314 km of rail track; by 1945, only 1,190 km were still functioning (Storz 1967: 149). Moreover, much of the pre-colonial network of inland waterways that had proved its worth over so many centuries – extending for around 6,500 km, with 3,200 km navigable in the Ayeyarwady Delta alone (Storz 1967: 154) – was unusable as almost all the ports, harbours and ships had been destroyed. Some of the vessels which had been deliberately scuttled in order to block the shipping routes were not raised until well into the 1960s. Making matters worse, there was also a lack of skilled workers for the reconstruction effort (KTAM Report 1953: 283, 336; Storz 1967: 155-157).

It was the first Eight-Year Plan (1952) which finally enabled the country to begin investing in rebuilding its infrastructure, the aim being to re-establish domestic and international trade links, cut transport costs, consolidate national cohesion by facilitating the transport of people and goods and create a more integrated transport system (Storz 1967: 139). By 1962, as part of the plans for an Asian Highway System, the development of two major west-east axes was already under discussion, the first being the route from Tehran via Delhi and Calcutta to Kalewa, via Mandalay, Taunggyi, Kengtung and Tachileik to Lampang and Bangkok and then to Battambang and Phnom Penh and on to Saigon, and the second running from Chittagong via Prome to Rangoon, Thaton and Hpa-an and onward to Bangkok, Kuala Lumpur and Singapore (Storz 1969: 143-144).

As the first step, several key bridges (notably those spanning the Pazundaung, Bago and Sittaung Rivers) and major overland routes were rebuilt, foremost among them the highway from Rangoon to Mandalay and onward to Myitkyina, and the Tavoy-Mergui axis. Several west-east routes were also developed or proposed for expansion, e.g. from Prome to Taungoo, from Meiktila to Taunggyi, and from Prome to Taungup (KTAM Report 1953: 378-379, Storz 1967: 146-148). It also took comparatively little time – from 1956 to 1960 – to restore the rail network to a length of 3,100 km. In 1950, repairs were carried out to the Gokteik viaduct, constructed in 1900; the Inwa Bridge near Sagaing was renovated in 1953 (Hla Tu Aung 2003: 534). The expansion of aviation also played an important role. By the late 1960s, the country had 33 airfields, including seven which were accessible even during the monsoon season (Storz 1967: 163-165). During the period of nationalisation after 1962 until the transition to a market-oriented policy of openness in 1988, the transport networks were further upgraded, not least through the expansion of the road system from 17,194 km (1961) to 23,462 km (1988) (Hla Tun Aung 2003: 519).

DEVELOPMENTS AFTER THE TRANSITION TO A MARKET-ORIENTED ECONOMY

During the transition to a market-oriented economy, national development was given a boost by a large number of new infrastructural projects which extended into hitherto largely inaccessible peripheral regions. In the process, the road network was extended from 27,840 km (1995) to 40,575 km (2015); more
importantly, however, major improvements were achieved in the quality of road-building (almost 23,000 km were tarred, compared with only 10,000 km in 1995). Road network expansion focused mainly on the Ayeyarwady, Magway, Mandalay and Sagaing Regions and on Chin, Kachin, Rakhine and Shan States. The number of registered vehicles also increased more than tenfold during this period, from 302,833 to 5,077,699, rising from 174,379 to 679,485 in Yangon alone. The rail network was extended from 3,977 km (1995) to 6,107 km (2015), and the number of railway stations rose from 612 to 960. Although the provision of state aviation services decreased between 1995 and 2015 – measured in terms of the number of flights (down from 5,090 to 4,474), distance flown (down from 4,501,000 to 3,885,000 km) and number of aircraft in service (down from 13 to just 10) – the volume of private civil aviation increased substantially, with a sharp rise from 2011 onwards: the number of flights per year increased almost tenfold from 2,360 (1995) to 21,361 (2015), and from just two aircraft in 1995, there were 64 in service in 2015 (all the comparative data for 1995 and 2015 are taken from MNPED 2015: 407-439).

THE TRANSPORT INFRASTRUCTURE: CURRENT STATUS

A glance at the current scale of the transport infrastructure shows the dominance of the north-south axis across all modes of transport, albeit with a small number of roads running in a west-to-east direction, e.g. from Pathein to Yangon, from Chauk via Meiktila to Taunggyi, and from Mandalay via Lashio to Muse, with various less significant routes leading into the mountains and towards the international borders. The backbone of Myanmar’s transport system is the 587 km Yangon-Mandalay Expressway, constructed from 2005 onwards and opened in late 2010, which connects its three major political and economic centres, i.e. Nay Pyi Taw, Yangon and Mandalay. The idea for the project goes back to the Pyidawtha Plan, conceived in 1952 during the period of post-war renewal (Government of Burma 1952, Lockwood 1958) but not implemented at first. The Expressway is open to cross-country buses and private vehicles but not to heavy goods vehicles and trucks. The rail network follows broadly similar routes but also fills the gaps in the road system, e.g. between Pakkoku and Kalay, between Monywa and Myitkyina, and in central Myanmar. Numerous airports and airfields have improved access to the peripheral regions (e.g. Kalay, Homalin, Puta-O, Kengtung, Tachileik, Myeik and Kawthaung). Alongside the major ports of Yangon, Sittwe, Thandwe, Pathein, Myeik and Kawthaung and the new major terminal at Thilawa, Myanmar has a number of smaller harbours. Deep-sea ports are currently planned in Kyaukpyu, Mawlamyine and Dawei.

LOOKING TO THE FUTURE: LARGE-SCALE PROJECTS

With an eye to the future, Myanmar is planning a number of large-scale projects whose purpose is to improve infrastructural connectivity within Asia. Several of these major projects aim to strengthen Myanmar’s links to neighbouring countries by establishing new transport corridors. As a member of the Association of Southeast Asian Nations (ASEAN), the Greater Mekong Subregion (GMS) and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), Myanmar is involved in numerous long-term infrastructure projects. As the volume of trade with neighbouring countries increases (Kyaw Min Htun et al. 2011, Florento/Corpuz 2014), Myanmar is likely to become a key regional centre due to its outstanding geostrategic location, with the potential to become a major transportation hub and gateway within Asia.

The Asian Land Transport Infrastructure Development (ALTID) project (established by UN-ESCAP in 1992) aims to expand the existing pan-Asian infrastructure initiatives. Its major components are the Asian Highway Network, the Trans-Asian Railway (TAR) and the upgrading of the intermodal transport terminals, including port infrastructures.
Urban population 2014
(towns defined by GAD, MINU p-codes release August 2015)

- Yangon: 4,798,524 (MDCC), Mandalay: 3,180,664 (MDCC)
- >500,000
- >100,000 - 500,000
- >50,000 - 100,000
- >25,000 - 50,000
- >5,000 - 25,000
- <5,000

Highway
Major road
Secondary road
Minor road
Railroad
Railroad under construction
International airport
International airport under construction
Domestic airport
Deep Sea Port
Deep Sea Port (Implementing project under construction)
Closed to open forest (>40% coverage)
Open forest, closed to open shrubland
Open land (cultivated area, grassland)

German-Myanmar Research Project:
"The 8th Main River Systems of Myanmar"
"Sub-Hydrologic Atlas of Myanmar"
Concept and Layout of the Atlas:
Ko Ko Aung, Wai Kyaw Lin
Copyright:
Institute of Geography, University of Cologne, Germany
Expansion of the infrastructure and development corridor from Mandalay to Muse has been under way for some years (Fan 2011, Zhao/Yang 2012). The first priority for the new schemes is to develop the border sections of Asian Highway 1 (from Kalay via Kalewa to Monywa in the west and from Myawaddy via Kawkaraik in the east) and Asian Highway 2 (specifically, from Kengtung to Taunggyi) as part of the India-Myanmar-Thailand trilateral highway project, which will ultimately result in a two-lane rapid transit route from Manipur (India) to central Thailand (Kyaw Min Htun et al. 2011). And for northern Myanmar, long-term development plans are in place for roads which faded into oblivion after independence, including the Zawkhawdar-Rhi and Nampong-Pangsu routes (the former Ledo/Stilwell Road; Kyaw Min Htun et al. 2011: 186, Florento/Corpuz 2014: 10-12, Yhome 2015a). Other bilateral and large-scale projects are being implemented as part of the Asian Highway schemes, including the Asian Development Bank’s GMS corridor (Duvall 2008, ADB 2012b). Plans are also in place to establish a Myanmar–Lao PDR–Viet Nam Trilateral East-West Corridor.

Currently, road transportation, as compared to other modes such as rail and inland waterways, is the most important public service for logistics; this applies to both passenger and cargo transport. The Ministry of Construction (MoC) has responsibility and has proposed a long-term strategy for road transportation involving a network of seven plus five expressways. Strategy formulation is supported by Korean experts from KOICA. This envisages five expressways for the South-North axis and seven for the East-West axis. MoC further recommends 6 packages of road network development which are prioritised for mid-term planning in accordance with national development policy. They are Mandalay-Myitkyina, Pathein-Monywa-Shwebo, Minbu-Ann-Kyaukphyu Deep Seaport, Yangon-Mandalay, Thilawa SEZ-Thanatpin-Kyeikhto, and Yangon-Pathein-Ngayokkaung.

The development of the border crossing points is also important and is an area where good progress has been made in recent years, notably in Muse, Tachileik and Myawaddy. Along the 1,643 km border between Myanmar and India, there are currently four Land Customs Stations (LCSs), of which the Moreh–Tamu LCS (open since 1995) is the busiest, whereas Champai–Rih (since 2004) and Nampong–Pan Saung handle relatively low volumes of trade. Avakhung–Pansat/Somrai is still at the planning stage (Das 2014). The lack of modern infrastructure and inadequate security continue to pose problems, with informal trade, smuggling, bribery and human and narco-trafficking adversely affecting cross-border relations (Florento/Corpuz 2014: 3-9). Also planned for the long term, with the Kaladan Multi-Modal Transit Transport Project, is the expansion of the route between Sittwe in Myanmar and Mizoram in India; this is being driven primarily by India as a solution to North-East India’s landlocked situation (Yhome 2015a, 2015b).

The Port of Yangon currently handles more than two-thirds of Myanmar’s ship-bound exports and imports (76.3% of net tonnage in 2017/15; MNPED 2015: 420). A new terminal is being constructed in Thilawa, linked to an industrial zone with a special economic zone (SEZ). In addition, deep-sea ports are being constructed in Kyaukphyu (Rakhine State), Kalegauk (Mon State), Dawei and Bokpyin (Tanintharyi Region) (Kyaw Min Htun et al. 2011: 190-195, Florenzo/Corpuz 2014: 14-17).

The Trans-Asian Railway (TAR) project is based on plans devised in the 1960s to establish a 14,000 km rail link between Singapore and Istanbul. Currently, the entire TAR network consists of 117,000 km of railroad. A new line from Jiribam via Imphal to Moreh will connect Myanmar’s section of the route from Tamu via Kalay and Segyi and between Thanbyuzayat, Namtok and Kanchanaburi to the Singapore–Kunming Railway Link (SKRL) (Florento/Corpuz 2014: 13-15).

Frauke Kraas, Aye Aye Myint, Hlaing Maw Oo and Myint Naing