

Road Transportation and its Future Developments in Sri Lanka

Abstract

The A- and B-class roads of the national highway network make the major part of the traffic-carrying network of the country. The development and maintenance of the network has been entrusted to the Road Development Authority of Sri Lanka. The development of the network at the initial stage was very slow due to the limited funds allocated for the development. With the realisation of the importance of the network for the economic development of the country, the government has launched an accelerated development programme with foreign funding. The development of high-mobility network has also been started, and they are in various stages of development.

Keywords: National Road Network, Expressways, Urban Traffic Congestion, Integration, Surface Transportation

Historical Background of the Road Transportation in Sri Lanka

For several centuries prior to 1850, the transportation in Ceylon remained as a public utility service. Since the economic activities were principally for local consumption, long-distance transportation and travelling with high speed was not essential. The use of manual labour, men and women carrying bulk on their heads or in make-shift litters, was the most readily available means, completely acceptable and representing a common mode of transport.

As the economic activities shifted to the export of raw materials, crude

rubber, coffee, tea and coconut, more rapid and efficient modes of transport were required. This gave rise to the use of marine shipments along the coastal and inland waterways, and bullock-carts and railways on the land. During the early 19th century, the motor vehicle, especially lorry, altered the existing concepts of passenger and goods transport.

Organisational changes

Prior to 1850, under the colonial administration, the surveying of and the construction of roads in the island had been a function of the military authorities up to the year 1833. These functions had been handed over to the civil authorities of the colonial administration in 1833. From 1841 to 1850, there had been a separate "Department of Roads" under the Commissioner of Roads, Major Thomas Skinner. In 1851, the name of the Department of Roads had been changed to "Civil Engineer and Commissioner of Roads Department". It was known by this name till the year 1862. It was in the year 1863 that the name had been changed to "Public Works Department" (PWD), but the designation of the Head of

Dr. Tissa U. Liyanage

*Managing Director
Master Helle's Engineering
Consultants Ltd.*

and

H. M. K. G. G. Bandara

*Director - Planning
Road Development Authority*

Department had remained unchanged. It was only in 1867 when Major Skinner retired, that the designation had been changed to "Director of Public Works".

In October 1969, the PWD was separated into two departments, namely, the Department of Highways and the Department of Buildings. The PWD continued by that name from 1863 to 1969. In 1905, there were 3,765 miles of major roads in Sri Lanka.

In 1971, all functions of the road maintenance and improvement of Department of Highways were handed over to the TCEO (Territorial Civil Engineering Organisation) of the Ministry of Irrigation, Power and Highways, leaving the Department only with the major highway and bridge projects. It was around this time

that the overseas system was abolished. After that, the Bridges Organisation of the Department

Table 1 Road lengths in kilometres in selected years in Sri Lanka

Road class	1946	1963	1971	1981	1991	1996
All roads	10,730	20,123	21,496	65,890	94,651	100,000
'A' class	1,400	1,800	2,201	3,798	4,116	4,220
'B' class	1,300	2,700	3,100	5,059	6,465	6,908
'C' class	1,800	3,500	4,488	10,856	5,012	8,457
'D' class	2,600	3,800	2,972	7,606	9,078	5,346
Others	3,630	8,413	8,735	38,571	69,980	75,069

Sources: Arjuna Atlas of Sri Lanka, Road Development Authority and Central Bank of Sri Lanka

was converted into a corporation called the "State Development and Construction Corporation".

In 1978 when the TECO was scrapped, the road maintenance functions were again handed back to the Department of Highways. In 1985, all functions of the Department of Highways were handed over to the Road Development Authority (RDA) formed under the Road Development Authority Act No 73 of 1981. With the 13th amendment to the constitution, only the national highways which consist of A- and B-class roads were left with the RDA and other roads were handed over to Provincial Councils.

Road network

Since the independence, the successive governments have paid more emphasis on improving and expanding road transport infrastructure than the other transport sectors such as railways, inland waterways, coastal shipping, etc. In a way, this has been an outcome of an attempt to accommodate the growing transport demand rather than a carefully-planned infrastructure development programme considering the needs of the overall transport sector, bearing in mind macroeconomic goals and objectives. Table 1 provides information on the road length of the country for some selected years since 1946.

Road transportation of Sri Lanka

The first passenger car was imported to Ceylon in 1902. The road system at that time was only main roads connecting principal towns. They were metalled and tarred, and had sound bases suitable for traffic conditions at the time. Road construction preceded vehicles, because of the need for permanent roads which could withstand the torrential rains. Many steel bridges

Table 2 Road transportation indicators for the year 2011 in Sri Lanka and in some selected countries

Country	Road Density (km/square km)	Contribution to transport demand (%)	
		Passenger	Freight
Sri Lanka	1.50	92	98
India	0.66	95	65
United States	0.65	89	60
China	0.16	-	-
Brazil	0.20	-	60
Pakistan	0.34	91	96

had also been constructed by the year 1900. Other roads were not "constructed" but merely graded by rather primitive means.

Some of the historical landmarks in the road construction are given below:

- i. The Bridge of boats near Colombo to cross the Kelani River was completed in the year 1822. This was used till 1895.
- ii. The Kandy road via Kurunegala and Galagedara was completed in the year 1831.
- iii. The Kandy road through Kadugannawa was also completed in the year 1831. The construction of this road had been taken about eleven years.
- iv. The first lattice girder bridge by the name Victoria Bridge was built in 1895 over the Kelani River.

By the time of the advent of motor lorry in 1907, the beginning of a planned-constructed, all-weather, motorable road system had been started.

The road system was gradually and progressively extended and improved so that during the period after 1945, it was reasonably able to accommodate an unprecedented growth of motor vehicles. Since then, the use of the motor vehicle has been grown rapidly. The PWD has added almost 5,000 miles of additional road to its system since 1947. During the same period, the number of vehicles, however, has almost tripled.

During the seven year-period from 1955 to 1962, while the road mileage has shown only a slight increase, the number of motor vehicles have increased at unprecedented proportions, especially during the three-year period from 1958 to 1961.

According to the record of the Road Development Authority, the islandwide ratio of persons per motor vehicle decreased from 177 in 1947 to 71 in 1961. These figures compare favourably with the ratio of other nations of the world and serve as a barometer of the rapidity with which Ceylon, since its independence in 1948, is approaching the saturation rate of the more highly-motorised nations.

Development of National Highways in Sri Lanka

Sri Lanka has a well-spread network of roads with a total length of about 116,800 km as per last year records of the Road Development Authority. The RDA maintains a total length of 12,020 km of trunk and main roads (A- and B-class roads) designated as National Highways. The secondary roads totalling about 16,000 km are managed by the Provincial Councils. There are about 4,000 km under government institutions like Mahaweli Authority, Department of Forests, Department of Irrigation, etc. The balance 84,800 km are minor roads that fall within various local bodies. The total length of roads, thus, accounts for a density

of 1.5 km per sq. km of land area. This is considered quite high when compared with that in other developing countries. (Table 2).

Despite this high road density, the land area occupied by roads in Sri Lanka, is quite low due to narrow widths of the right-of-way of our roads.

The road transport which accounts for 98% of the total freight transport and 92% of the total passenger transport of the country far dominates the other modes of transport as railways, inland water transport and air transport. This is due to many technical, economic and social advantages of road transportation over the other means, such as:

- i. Comparatively low coverage of the island by railways
- ii. Reliability of the road transport service
- iii. Personalised use of road transport
- iv. Well-spread network of roads
- v. Deterioration of railway service in the past

In view of that the dominant role played by road transport compared to rail and other modes, demand is bound to increase and not diminish in the future. Therefore, the importance of the maintenance, rehabilitation, upgrading, expanding and development of the road infrastructure of the country need not be over-emphasised. Major part of the traffic of the country (70% of total vehicle kms) is carried on the national highway network as the network is well spread all over the country. (Transport in South Asia, viewed 18th November 2011, < <http://go.worldbank.org/HYDXPSL170>>).

Development plans of the national highway network

In spite of this substantial increase in traffic demand, there was very little investment for the construction of new highways or for widening and improving the existing trunk roads prior to 1985. From 1985, the RDA has undertaken several major road rehabilitation programmes with the foreign-donor assistance (Table 3).

The following activities have identified by the RDA to increase the capacity of the road network to meet future demands of economic development of the country:

i. Development of high-mobility network (Expressways/Motor ways/High standard new major highways)

There is a need for improving the high-mobility intercity highway network as limited access expressways to reduce the travel time for intercity travel as a special need. It is expected to improve the national economy by saving important working hours by saving passenger travel time and freight travel time in long-distance travel. This need can be justified by analysing the speed and the accident of our national road network compared to that in other developing and developed

Table 3 Improvements to national highways during 1985-2004

Period	Length (km)	Funding source
1985-1987	299.15	World Bank
1986-1992	219.00	ADB
1992-1995	274.00	World Bank
1992-1995	154.30	ADB
1996-2001	184.56	ADB
1999-2002	44.00	EDCF Korea
2000-2004	174.00	ADB
2001-2004	71.00	JBIC Japan

ADB - Asian Development Bank
EDCF - Economic Development Corporation Fund
JBIC - Japanese Bank of International Corporation

Source: Record of Road Development Authority

countries. The average speed on national road in United States is 60km/h in urban areas and 80 - 110km/h in rural areas. The average speed that can achieve in Sri Lankan national roads at present is 40km/h in urban areas and 70km/h (is the maximum design speed) in rural areas. However, due to the demand for high-speed travel for intercity travel on this national road network, drivers tend to violate the speed limits which results in serious accidents. Therefore, it is required to construct high-speed mobility network, in addition to improving the existing national road network in Sri Lanka.

ii. Major improvements to the existing national highway network including realignment

The present design speed standard for the majority of the national highways (almost all B-class roads) is 40km/h due to the existing road geometry as well as their pavement condition. However, as per the worldwide records, average

Table 4 Average accident rate on Galle Road (Matara - Hambantota)

Type of Accident	Number of accidents reported or estimated per year	Accident rate on A2 (accidents per mn vehicle kms)
Fatal	52	0.7
Grievous	94	1.3
Non-grievous	190	2.7
Damage (Reported)	210	3.0
Damage (Unreported)	1,000	14.2

Source: Economic Feasibility Report, Extension to Southern Expressway from Matara to Hambantota, University of Moratuwa, 2007.

demand should be at least 70km/h on national highways to contribute to increase economic growth. The police records indicate that the accident rates are increasing with the increase in vehicle growth rate. The main reasons can be the bad geometry, especially in rural areas, deteriorated surface conditions, driver stress, increased travel time, congestion with reduced road capacities in urban areas, and uncontrolled, unauthorised roadside development, etc. Also the major burden to RDA is the need for investing a large amount of money on maintaining these aged road pavements to maintain a satisfactory level of service to the users. Therefore, it is required to improve the national road network with very good surface and improved geometry.

iii. Construction of a system of ring roads/major by-passes and flyovers to cities, major towns and important urban centres

One of the major problems in road transportation is the concentration of traffic movements in urban areas. This is due to the concentration of the urban activities in certain areas and increased local traffic movements within such areas. Therefore, additional capacity developments are needed in the absence of traffic management schemes which can also be used to reduce traffic demand in urban areas. Even though, these traffic management schemes are successful in countries like Singapore, Malaysia, England, none of the Sri Lankan Governments has initiated any congestion pricing so far. Even though this will be a social issue in the short term, it is important to consider congestion pricing for busy areas like Colombo in the long term as increased

capacity will create more traffic to busy areas and will not be a long-lasting solution to the traffic congestion in Sri Lankan cities.

The infrastructure development options for the medium term should be construction of by-pass roads in congested cities to ease the long-distance trips. Introduction of carefully-planned flyovers to improve intersection capacities and construction of new ring roads in urban areas to improve the connectivity between main radial roads increase the overall network capacity in urban areas.

Development of high-mobility road network

Considering the major corridors of the network, five expressways were identified as an initial step by RDA. They are:

- i. Southern transport development project (Alternate highway from Colombo to Galle and Matara)
- ii. Colombo - Katunayaka expressway
- iii. Outer circular highway to the City of Colombo
- iv. Alternate highway from Colombo to Kandy
- v. Alternate highway from Katunayaka to Anuradhapura via Padeniya

These highway projects are in different stages of development as indicated below in the detailed of individual projects:

i. Southern transport development project

Because of the strategic importance to the country's political

stability and economic prospects, there is an immediate need for improving transportation to the southern region. The existing Colombo-Galle-Hambantota-Wellawaya Road (A2) provides the main link between Colombo and the Southern Province and is already heavily congested. Due to the heavy traffic on this highway, accidents are also very high.

According to the recent feasibility study of the extension to the southern highway reveals that the present rate of safety on the A2 road (Table 4) roughly translates to around 740 deaths per billion vehicle kms. This is around 3 times more than what is observable on international expressways. Thus, a 75% reduction in road safety may be assumed by constructing a standard expressway. However, such safety will only be possible if the road designs are in order. To achieve this, there should be adequate provision for road safety monitoring and enforcement.

The expressway has already been completed from Kottawa to

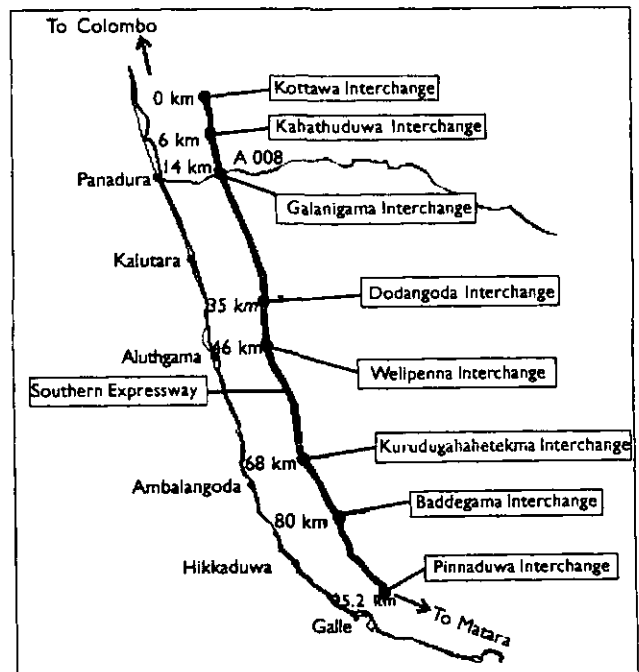


Figure 1 Interchanges of the southern expressway

Pinnaduwa (Galle) and was opened on 28th November 2011 for the traffic. The expressway starting from Kottawa-Makumbura on the Colombo-Ratnapura-Wellawaya-Batticaloa (A4) will traverse the hinterland areas of the Kalutara, Galle and Matara Districts and will end in Godagama on the Galle-Akuressa Road (A24). A new access road to Galle from the expressway has been constructed under the project. The total length of the Highway is 126.1 km. Interchangers will be the only points where traffic can enter. The interchange locations from Kottawa to Galle are shown in Figure 1.

The highway has been constructed with a 4-lane facility and land has been acquired for a 6-lane facility in future. Total estimated cost for the full 126,1 km length of the expressway is around Rs. 95.3 billion.

ii. Colombo-Katunayaka expressway project

The proposed expressway has a four-lane facility to cater to a design speed of 110 km/hr. This 25-km expressway has been provided with four interchanges at Peliyagoda, Kerawalapitiya, Jaela and Katunayaka. The Outer Circular Highway (OCH) has been connected to the expressway at Kerawalapitiya.

The construction cost of the project is around Rs. 32.0 billion and funding has been obtained from Exim Bank of China. The work is in progress at present according to the present construction programme and will be completed by the end 2012.

iii. Outer Circular Highway (OCH) to the city of Colombo

The outer circular highway which has been located approximately 20 km away from the city of Colombo has been identified to cater to increasing traffic demand, to minimise traffic congestion on the existing trunk roads radiating from the city and to

encourage regional development and a better balance in urban growth.

The project will be implemented in 3 phases, and the construction work of the phase 1 from Kottawa to Kaduwela has already been

started under Japanese funding. The procurement work for the phase 2 from Kaduwela to Kadawatha is in progress at present. This section also will be funded by Japan. The third section from Kadawatha to Kerawalapitiya is to be implemented on turnkey basis.

The highway will be constructed with a 4-lane facility initially, and land will be acquired for a 6-lane facility for future. The total estimated cost is around 84.4 billion rupees.

iv. Alternate Colombo-Kandy highway

With a view to overcome the serious traffic congestion on the existing Colombo-Kandy road (A1), it has been decided to construct a new limited access highway from Colombo to Kandy to promote economic development of the Central, North-Western and Eastern provinces of the country.

Table 5 Road lengths completed from 2005 to 2010

Year	Length completed (km)		
	Under Foreign Funds	Under Local Funds	Total
2005	59.70	238.89	298.59
2006	174.81	439.13	605.94
2007	202.14	124.60	326.74
2008	355.45	59.03	414.48
2009	1,008.33	280.00	1,187.66
2010	207.40	536.30	743.74
Total	2,007.83	1,677.95	3,577.15

Source: Road Development Authority.

Table 6 The existing sources of funding and selected road lengths for improvements

No	Funding source	Length under taken (km)
1	Asian Development Bank	373.5
2	French Funding	127.4
3	World Bank	134.3
4	Chinese Banks	991.8
5	JICA Japan	99.0
6	EDCF Korea	128.6
7	Local fund	450.0
	Total	1,931.1

Source: Road Development Authority.

With the feasibility study carried out in 2000/2001, a road corridor has been identified for this highway. The road corridor starts from Kadawatha (interchange with OCH), and it will pass close to Ganemulla, Gampaha, Ambepussa, Devalegama, Rambukkana, Hatheraliyadda and, Hedeniya, and end at Katugastota on Kandy-Jaffna road (A9). The total length of the corridor from Kadawatha to Katugastota is 98 km. There will be 10 tunnels for the highway of varying lengths from 30 m to 450 m. The highway will be constructed with a 4-lane facility in two stages. The first stage is from Kadawatha to Ambepussa, for a length of 48 km. Land acquisition work for the stage 1 is in progress at present.

v. Katunayaka-Padeniya-Anuradhapura-Jaffna highway

Presently, there are 3 ways of reaching Anuradhapura from Colombo varying from 168 km. to 204 km. in distance. The shortest

and the most common route is a combination of several B-class roads up to Padeniya and along an A-class road to Anuradhapura from there onwards.

A recent study revealed that the construction of an expressway starting from Katnayaka with link to Colombo- Katunayaka expressway is difficult task due to the expansion of Katunayake airport and the high level of land acquisition involved in the area. The expressway starting from Colombo-Kandy highway at Ambepussa or location close to that is more viable, and it can be linked to the expressway network to the eastern and the northern part of the country. This highway will start from Colombo-Kandy highway and pass between Kurunegala and Wariyapola and link to Dambulla. There onwards, it can be linked to Trincomalee, Anuradhapura and Jaffna.

iv. Extension of Southern Transport Development Project (STDP)

With the government initiative of the development of Hambantota as an international hub with Hambantota sea port and Mattala airport, there was a necessity to extend the southern transport development project to Hambantota to link these facilities to high-mobility network. The RDA has carried out a feasibility study and identified a trace of a 74-km length. This will be developed with a 4-lane facility initially and improved to 6 lanes later. The ground survey work for the identification of exact trace is in progress at present.

Major improvements to the existing national highway network

With the realisation of the requirement of rapid development of the existing network, government has launched accelerated

programme for the improvement of the existing network while investing on the above-mentioned high-mobility network. The completed highway projects in last five years, based on the RDA records, are given in Table 5.

There are several on-going improvement projects under different sources of funding and road lengths under these funds are given in Table 6.

The RDA has developed a National Road Master Plan (NRMP) for the development of national roads in 2007 covering the 10-year period from 2007 to 2017.

Some Thoughts for the future planning of highway improvements

Urban highway set up

The urban highways in Sri Lanka are well developed with often more than two-lane standards and with very good surfacing. Therefore, the riding quality is at an acceptable level. However, the major problem in our cities is the traffic congestion for several hours of the day. The reason is that a large number of vehicles use our urban road network for various reasons during different hours of the day. The limits of the highway capacities have always exceeded due to the above reason on these urban links at present. However, further expansion of the road widths are not possible with already developed building infrastructure beside the urban highways.

The reasons for the traffic congestion in urban areas are poor public transport supply, high income concentration to urban areas and high affordability of private vehicles, undesirable taxation policies for vehicle imports, affordable fuel charges,

undesirable taxation on fuel charges, friendly-procedure for obtaining driving licence and inefficient integration between public transportation (bus and railways).

Therefore, one main concern in traffic management in highly-congested urban roads is widening of the roads in urban areas. But this is not possible. The options that have been adopted in other developed countries are; improving public bus and railway transportation in urban areas as a national policy, restrictions of the usage of private motorised vehicles in congested areas by means of congestion pricing schemes, revision of the vehicle import policies, parking restrictions, increasing street parking fees and so forth. Most of these are in practice in Singapore and other developed countries and has been very successful at present and well contributed for high economic developments of such countries. What we have to think is that "We need people to the cities but not the vehicles that occupy valuable activity spaces of people".

Furthermore, we need to improve the urban highway infrastructure for improving the highway capacities by various ways to make sure that the required traffic flows to the cities are uninterrupted for future demands. Improvements to highway intersections, segregation and improvements to pedestrian facilities, parking control and facility designs are most important highway improvements in urban areas. Intersection capacities by improvements and review of traffic signals, grade separation with flyovers, channelisation at junctions and introduction of one-way traffic systems are some options. However, these should be implemented after very

comprehensive studies. Therefore, it is our responsibility to make use of the professional knowledge and integration always to make sure that we do the correct things to avoid the wastage of valuable resources for the economic development of the country.

High-mobility intercity road network

It is important to have a very good high-mobility intercity road network in the country to connect the main district capitals of the country. The initiatives have been already taken by the RDA to cater to this need. The above-mentioned expressways have been proposed, and they are at various stages of development from design to implementation. It is important to plan high-mobility network according to the economic development master plans for the entire country and to suit to the future demands between the main capital district centres in Sri Lanka. The already proposed expressways have covered only the Western, Central, and Southern provinces according to the present plans. However, there is an immediate need of having connectivity to the North, North Central and Eastern provinces to link this expressway network. Also, it is important to link Uva province to have an economic balance among different geography of the country to elevate the most suffering region by poverty.

Integration between highway and railway

Even though we have planned many highways and expressways, there was no thought of integrating them with railways. This is a very important aspect from the economic development of a country. It is very useful for the alleviation of the traffic congestion in urban areas by increasing the passenger and goods-carrying capacities by improving the

mass transportation modes as most developed countries are successful today. The railway must be the main and most economical way of mass transportation on the surface. It is important to increase the capacity of the mass transit systems by means of increased speed and frequency with low headways. Electrified trains, metro systems should be the solutions for railway infrastructure developments as long-lasting solutions, even though they are expensive and make short-term economic impacts to the country.

Conclusions

There is very positive thinking of the road agencies towards the development of the road sector. Measures have already been taken for planning and improving a significant length of expressways across the country. However, the integration of surface transportation, urban traffic management, equitable distribution of benefits, etc. have not been considered in the master plans as expected targets in the long term. Also more emphasis is needed for the evaluation of the cost effectiveness of the investments to meet the transportation needs of the country as a whole rather than trying to evaluating the highway sector alone. The passenger kilometres of a country is a better indicator of the sustainability of the transportation of that country for economic development rather than the vehicle kilometres that the people travel. Therefore, it is very useful to think how we can improve the economic activities by giving facilities for the labour force of Sri Lanka for their day-to-day transportation needs in an economically viable manner by integrating and making possible

improvements to the surface transportation of Sri Lanka.

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