

Infrastructure Development in Nepal: Opportunities and Challenges for Engineers

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1. Background

Nepal is a developing country with its low per capita GDP of USD 320. Four-fifth of its land form comprises of hills and mountains and 80 percent of its population live in the rural areas. Thirty percent of the people live below the poverty line and 45 % of the population are unable to read and write. The rural areas lack minimum physical facilities. The major challenge for Government of Nepal is to provide adequate infrastructure to these remote and scattered settlements.

Infra structure development in Nepal started during 1050. and until then Nepal had no infrastructure linkages to the rest of the world . Since then, the government has been making efforts to provide increased access to education, transportation, communication, health services, electricity and other infrastructure services. Despite these efforts Nepal remains one of the poorest countries with poverty reduction as the major challenge. One of the most dominant challenges of Nepal is to develop the basic infrastructures to accelerate its pace of development. For this, transportation plays a vital role in the overall development and socio-economic transformation of a country. In Nepal, road transport has predominant role because it is the only means for public transportation except the limited air service to some part of the country which is not affordable to common people. Therefore, Road infrastructure serves as a backbone for an overall socio-economic development of Nepal. Negligible length of Railways available in Nepal has diminished surprisingly in the last 4 decades. Janakpur Jainagar Railway which is a narrow gauge in poor condition is the only railway facility in Nepal . Since the overall development of Nepal is pivoted around Infrastructure development focussed at road transport and aimed at poverty reduction , Government of Nepal has its priority in this sub-sector.

2. Status of Road Development in Nepal

Road development in Nepal started only after the advent of democracy in 1950. The first motorable road was constructed in the Kathmandu Valley by the then Rana rulers in 1924. The 42 km all weather gravel road between Amlekhganj to Bhimphedi was the first road of its kind constructed in 1929 outside the Kathmandu valley. The first long distance road to link Kathmandu with the Terai was taken up in 1953 with Indian assistance. This 115 km long road between Thankot (Kathmandu) and Bhainse(Makawanpur) was opened to traffic in 1956.

The National Road Network comprises of National Highways, Feeder roads, Urban roads, District roads and Village roads. The National Highways together with the Feeder roads constitute the Strategic Road Network (SRN) of the country. The Strategic Road Network is the backbone of the National Road Network. The construction and maintenance of the strategic roads fall on the responsibility of the Department of Roads.

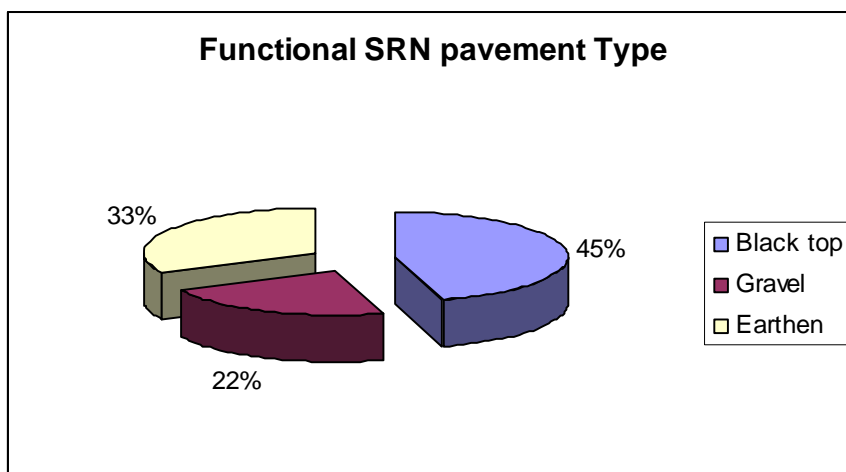
These district roads together with village roads constitute the District Road Network. At present the National Road Network has altogether 24000 km (30% blacktop, 27% gravel and 43% earthen roads) in 2008. The strategic, urban and local roads share 32.5%, 13% and 54.5% respectively in the National Road Network.

The Strategic Road Network serves as the backbone of the National Road Network. The strategic roads have high traffic volume in comparison to district roads. There are 15 National Highways and 51 Feeder roads totalling 8000 km in the Strategic Road Network. The government plans to increase the length of SRN to 12000 km by the year 2017.

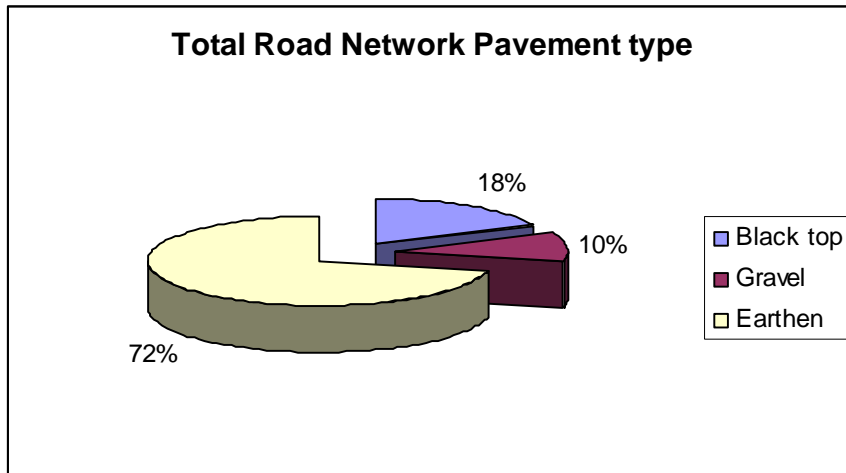
Local Road Network (LRN), comprises of District Roads, those urban roads not included in SRN, village roads, agriculture roads, mule trails and tracks, Trail Bridges, Ropeway etc. With the advent of Multiparty democracy in 1989, there has been a tremendous demand of constructing roads in rural areas. Though there are District Transport Master Plans prepared by the districts the growth of LRN is quite haphazard.

Road development status of Nepal is not satisfactory compared to the south Asian countries. Nepal has a very low road density of 6.39 km per 100 sq km thus indicating poor accessibility to various parts of the country. At the end of first year of eleventh plan 6 district head quarters namely Bajura, Dolpa, Mugu, Humla, Manang, Solukhumbu are still lacking road connection. The Eleventh plan aims to road link the 3 district headquarters namely Bajura, Manang and Solukhumbu this year and the remaining three headquarters by the end of the eleventh plan that is 2010.

The status of Strategic Road Network based on type of pavement is presented in Chart 1



Present scenario of total Road Network, SRN and LRN with respect to pavement category is shown in Chart 2



The comparative Chart of Strategic Road Network length is shown in table 1

Table 1: The comparative Chart of Strategic Road Network length, Influenced Population and Density (1998-2006/7)

Year AD	Description	Length			Total	Influenced population (No. per Km)	Density Km/100 sq km
		BT	GR	ER			
1998	9 th five yr plan	2905	1656	179	4740	3901 +	3.22
2000		2974	1649	171	4794	3857 +	3.26
2002	10 th five yr plan	3029	1664	168	4861	4763 ++	3.30
2004		3495	883	614	4992	4636 ++	3.39
2006/07		4258	2062	3079	9399	2463 ++	6.39

Population census 1991 +

Population census 2001 ++

Singapore has the highest road density of 462 km per 100 sq km. Nepal is ranked 29th in Asia after Bhutan and Lao PDR. Compared on the basis of percentage of paved road, Nepal lies much behind in the region.

3. The Legal Frameworks

Infra structure development has remained a priority of the government right from the beginning of first five year plan. With a view to facilitate and to create enabling environment many legislations have been enacted since then. Rules, Regulations and Guidelines have been developed and put to use. Policy documents have been passed and practised so as to streamline the direction of the development. In this connections the following Acts , Regulations, policy frameworks etc. have been brought in place:

- 1 Public Roads Act, 2031
- 2 Local self Governance Act 2054 and Regulations 2055
- 3 Public Procurement Acts 2063 and Regulations 2064
- 4 Contract Act, 2023 and 2058
- 5 Construction Industry Acts 2055
- 6 Private Investment in infrastructure, Build and Operate Ordinance 2060
- 7 BOOT Acts 2063 and Regulations 2064
- 8 Roads Board Act 2059
- 9 Engineering Council Acts 2055 and Regulations 2057
- 10 Road Sector Policy 1999
- 11 Public Infrastructure Build, Operate and Transfer Policy 2057
- 12 Priority Investment Plan 1997- 2007
- 13 Priority Investment Plan 2007 – 2017
- 14 The Department of Roads Strategy 1995
- 15 Road Maintenance Training Policy 2001
- 16 Human Resource Development Policy and Strategy 2002
- 17 Bridge maintenance Policy, 2004
- 18 Consulting Industry Acts (Development phase)

4. Donor support in Road development

There has been good support from different donor communities towards the development of road sub sector in Nepal. Among the major contributors are India,

China, Japan, UK, USA, Switzerland, Germany etc. There is a generous support from Asian Development Bank and World Bank for the development of road networks and also for maintenance/ rehabilitation of existing roads. The following projects are being implemented with donor supports:

- Syafrubesi Rasuwagadhi Road : Grant assistance of Government of China
- Terai Road Project : Grant assistance of Government of India
- Road Improvement Project : Loan from Exim Bank, Government of India
- Banepa Sindhuli Bardibas Road: Grant Assistance from Government of Japan
- Koteshor Bhaktapur Road: Grant Assistance of Government of Japan
- Road Sector Development Project : Grant assistance of World Bank/IDA
- Road Network Development Project: Loan from Asian Development Bank
- Sub Regional Transport Facilitation Project: Loan from ADB
- Kathmandu Terai Fast Track Project Development : ADB Loan
- Road Connectivity Improvement Project : Grant Assistance from ADB
- Road Sector Development project preparation: Grant from World Bank
- Flood Rehabilitation Program : Proposed Grant from ADB

5. The opportunities for development

Nepal is a small and beautiful country. The bio-diversity that exists across the narrow cross section of the country is quite vast. The water resources that are available here could be harnessed for global benefits. The friendly people here with a pride history could be of interest as a living museum to global visitors. The country has a tremendous amount of load shedding which needs to be removed in near future by constructing thousands of Megawatts of electricity. Government aims to provide by the year 2017 transportation facilities to its people in a maximum of 2 hours and four hours walk in plains and hills respectively. Thousands of Kilometres of good standard roads need to be constructed to achieve this target. With these special needs and circumstances the opportunities for development of infrastructure could be as below:

1. Development of highways, fast track and expressways
2. Development of hydropower both for internal use and export
3. Development of tourism both Internal and foreign
4. Development of trade and transit with neighbouring countries
5. Development of forest products, medicinal plant, wild life and pastures
6. Development of Consulting and Construction industries

7. Attracting Private sector funding in infrastructure development
8. The changed transport need brought about by the introduction of Federal states
9. The growing need for Construction of Expressways / fast track
10. Critical need for development of settlements and townships
11. Practising Earthquake resistant design and technology
12. Research and Development aimed at indigenous and efficient construction.

6. The Challenges being faced

Development of surface transport in Nepal faces various challenges due to the rugged topography, fragile geology, numerous river crossings etc. Some of those cross cutting issues to be addressed in connection with development of roads are as follows:

- 6.1 Management of Funding gap through internal resources and donor support
- 6.2 Infra structure development in rugged Topography and fragile geology complicated by high seismicity and big rivers
- 6.3 Brain drain of skilled manpower
- 6.4 Non engineered roads and other infrastructures on local initiatives
- 6.5 Development of Railways under difficult gradient and numerous crossings
- 6.6 Inadequate Maintenance considerations for already constructed infrastructures
- 6.7 Lack of political stabilities and prolonged transition phase
- 6.8 Quality Control and sustainability in question
- 6.9 Need for controlling Corruption and Fradulent practices
- 6.10 Harsh competition with the membership of WTO

Conclusion

Nepal has been able to expedite its infrastructure development in the last two decades. This has made it possible that all the district headquarters would be road linked within next two years. Infrastructure including Road transport is seen as a vital tool towards poverty reduction. People have shown their keen interest towards infrastructure development in their areas. The donor support towards infrastructure development is increasing over the

last few decades which have been instrumental to shape the road network of Nepal to present status. Legal provisions such as Acts, Regulations, plans and policies are in place to create enabling environment. The private sectors are willing to put their investment to infrastructure sector once the political stability is restored. Rapid progress of China and India, the two big neighbours could benefit Nepal from their development. The opportunity for infrastructure development is therefore, quite high in Nepal. Capacity building of both the consulting and construction industry is required in order to shoulder this responsibility mostly from within the nation.

The past efforts and experiences have revealed that there are some constraints to develop basic infrastructure. The funding has always remained as a key issue. Haphazard and non engineered construction has raised serious concerns towards the sustainability of already opened track roads. The quality control has not received due emphasis in some of the infrastructure developments in the past. These issues need to be addressed well as the country moves towards 'construction of New Nepal'. With these opportunities and challenges Nepal has put its highest priority towards the extension of its road network Together with the donor support, mobilisation of internal resources including private funding and asset maintenance priority the scope for infrastructure development is tremendous. Based on the past experiences it is believed that poverty reduction would be realised through adequate, safe and sound road network. For the development of necessary infrastructure Engineers role is very vital. So, the role of consulting engineers for building new Nepal is of utmost importance. Nepalese consulting Industry together with the construction industry here should develop themselves side by side so as to shoulder this responsibility that the time is going to put on to them.