

NEWSLETTER



Department of Roads (DoR)

E-mail: mis@dor.gov.np
Website: www.dor.gov.np

Vol. 28
January 2022

Table of Contents

1. Appointment of new Director General	1	5. Road Safety Status in Nepal	5
2. Major achievements during tenure (2021/2/17-2021/12/30) of former DG Er. Arjun Jung Thapa	1	6. Self-Compacting Concrete for Pile Foundation	6
3. Progress in First Trimester of Fiscal Year (F.Y) 2078/079	2	7. Selection of Candidate Roads for Periodic Maintenance under SRCTIP	8
4. Design & Construction of Seti River Bowstring Steel Truss Bridge	2	8. Status of Postal Highway Project	12
		9. Photograph of Some Major Works in Fiscal Year 2078/079	15

1. Appointment of new Director General



Er. Shiva Hari Sapkota has been appointed as a new Director General (DG) of DoR and welcomed by DoR staffs in DoR meeting hall on 31st December, 2021. In the meantime, former DG Er. Arjun Jung Thapa was bade farewell who has been transferred to Ministry of Physical Infrastructure and Transport (MoPIT) in the position of Joint Secretary. In the program the new DG has expressed that DoR will have following priorities in his tenure.

- Work to resolve chronic contracts in DoR.
- Enhance Road safety works in National Highways focusing in pillar two of action plan.
- Initiate to work for institutionalization of Engineering governance in DoR.
- Enhance all types Road maintenance works in National Highways. Major focus in Pot hole repair of roads under DOR jurisdiction and keep it pothole free.
- Accelerate the preparation of typical Designs/ Drawings for short and long span bridges.
- Continuation of Bioengineering and Road asset management works.
- Establish DoR's own Resource Center for excellence at Gajuri with modern facilities.

His education and experiences are;

Education: Master of Science in Engineering (Civil) from Kiev, Ukraine, USSR 1992.

Training: International course in Highway Construction and Maintenance works from Malaysia in 2006/2007.

Experience: Joint secretary MoPIT; Deputy Director-General Planning, DoR; Regional Director, Center and Eastern 2071 to 2075; Joint Secretary, National Vigilance Center from 2069 to 2071; Division Chief, DRO Dhankuta 2067 to 2069; Project Manager, Harkpur Okhaldhunga Road Project ADB from 2066 to 2067; SDE, MoPIT 2063 to 2066; Engineer DRO Charikot from 2057 to 2063; Engineer, Nepalgunj and Pokhara Airport upgrading works ADB, Department of Civil Aviation from 2052 to 2057.

2. Major achievements during tenure (2021/2/17-2021/12/30) of former DG Er. Arjun Jung Thapa.

- Revival of Bio-engineering by establishing nurseries and implementing slope stabilization works in roads under Divisions and Project Offices.
- Planning and designing of modern office buildings in all Federal Monitoring Offices and Road Division Offices.

- (c) Strengthen Laboratory facilities in all Road Divisions and Projects Offices to enhance the quality of construction and maintenance works.
- (d) Revival of DoR Newsletter and publish it regularly.
- (e) Accelerate publication work of different guidelines and manuals that are useful for design, construction, supervision and maintenance works.
- (f) Approval & Implementation of O&M Survey and make necessary plans for strengthening human resources.
- (g) Accelerate the preparation of typical Designs/ Drawings for short and long-span bridges.
- (h) Design of DoR's own state of art training Center at Gajuri with modern facilities for implementation.
- (h) Focus on Road Assets Management works of DoR.
- (i) Development of curriculum for training in different areas.
- (j) Initiation & coordination for the construction of a new Department of Roads office building.
- (k) Accelerate approval procedure of bridge design works.
- (l) Updating of equipment hire rate for departmental estimation purposes.

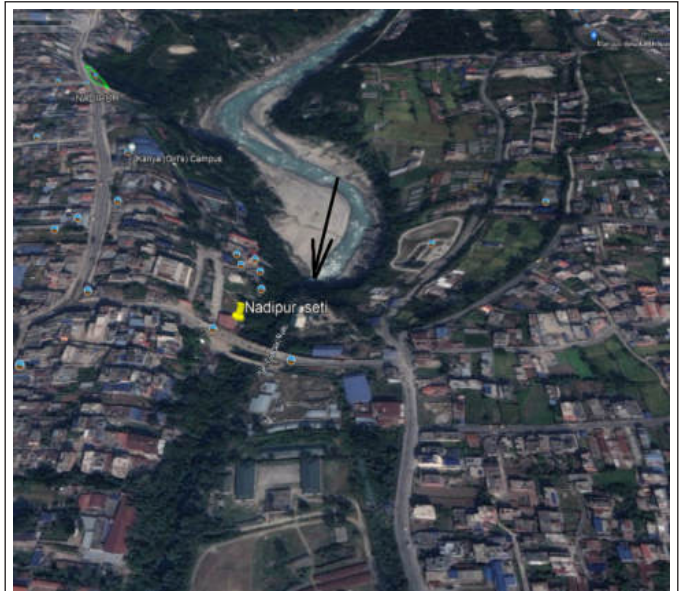


Fig.1 Google map of bridge site

3. Progress in First Trimester of Fiscal Year (F.Y) 2078/079

-PMEU Unit, DoR

S. N	Details	Units	Annual Target	First Trimester		Progress (%)
				Target	Progress	
1	Blacktop Road	Km	1800	235	85	36.17
2	Gravel Road	Km	800	185	75	40.05
3	Earthen Road	Km	325	107	72	67.02
4	Reconstruction and Rehabilitation of Blacktop Road	Km	600	70	30	42.85
5	Periodic maintenance	Km	465	120	30	25.00
6	Bridge Construction	Nos	300	66	22	33.33
Financial Progress: 25.38%						

4. Design & Construction of Seti River Bowstring Steel Truss Bridge

-Dr Bijaya Jaishi, SE, FRSMO, Kathmandu

4.1 Introduction

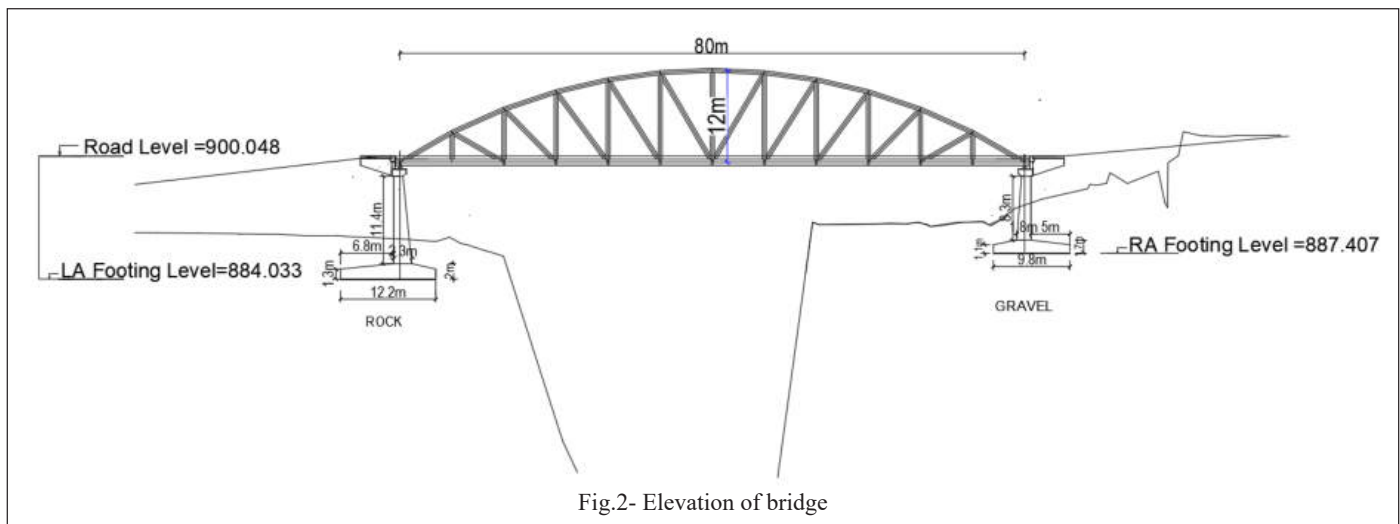
The bridge site is located at Nadipur that connects Ward No.3 and 11 of Pokhara Metropolitan city at Pokhara. The Google co-ordinate of bridge site is 28013'46.68"N, 83059'33.66"E. The Google image of bridge site is shown in Fig.1. DOR has

constructed this bridge as an alternative crossing to existing old RCC bridge. This bridge improves alignment and shortens the distance avoiding curved alignment in right side. The contract for construction of this bridge was awarded in B.S. 2073/7/24 as a Design Build contract. The contractor was Hirachan MuktiNath JV Pokhara. The construction has been completed and opened to traffic in Asoj 2076. In such type of bowstring truss, top chord is a true arc and members are often like a pratt. The bowstring truss bridge was patented in 1841 A.D. by Squire Whipple. A bowstring truss has diagonal load-bearing members: these diagonals result in a structure that more closely matches a Parker truss or Pratt truss than a true arch. This bridge has set up records in the bridge construction history in Nepal and is a first double lane highway bridge of this type. Such bridge has advantage in Nepalese topography since the construction does not demand construction of pier in narrow deep gorge, work can be carried out in all seasons and flood has less effect on bridge.

4.2 Salient feature:

The general arrangement of bridge is shown in Fig.2. The salient feature of bridge is presented below:

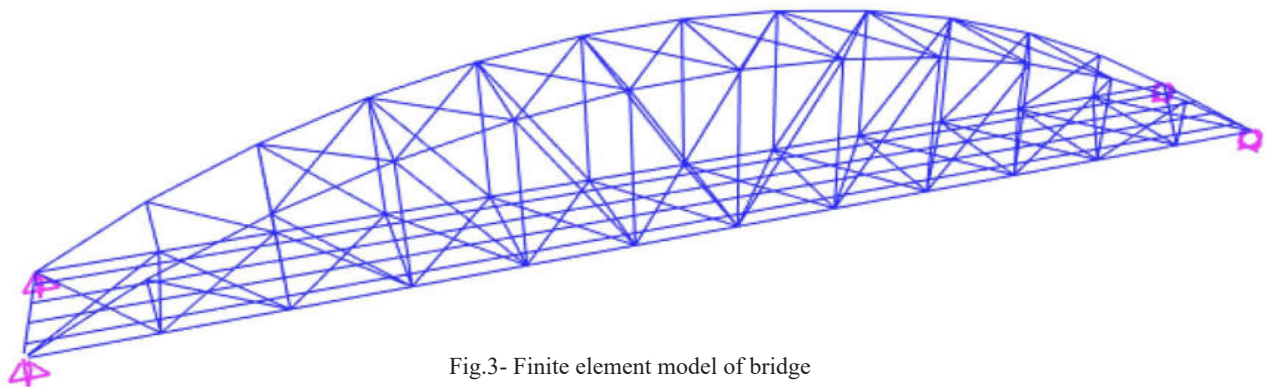
Total length of bridge=81.30m
Span (L) =80.0 m
Arch Rise = 12.0 m
Carriageway width=7.5m
Footpath width=1.3m
Deck= M35 concrete, HYSD bars Fe 500
Structural steel= E-350
Bolt= HSFG bolts of 22 dia 8.8 grade
Left abutment= Height:16.015m, width:12.2m
Right abutment= Height:12.641m, width:9.8m
Steel weight (approximate)= 300 T
Contract amount: NRs. 11,23,16,100.0



4.3 Design

The bridge is designed as per IRC design specification. The main loads considered are (i) Dead load (ii) Moving load (iii) Braking load (iv) Wind load (v) Earthquake load (vi) Temperature load (vii) creep load (viii) Shrinkage loads. The main design steps are:

- (a) Design of deck slab
- (b) Design of stringer
- (c) Design of cross girder
- (d) Design of truss members: top chord, bottom chord, knee/diagonal/portal bracing, lacing,
- (e) Design of abutments
- (f) Design of Mechanically Stabilized Earthen (MSE) wall in approach road



The finite element model is developed in SAP2000 (Fig.3) to find out the internal stresses in different elements which has been compared with manual analysis. In FE modeling, slab has been modeled as shell element; stringer, cross girders are modeled as frame elements and truss members are modeled as frame elements with end moment release. Linear static analysis, non-linear static analysis, buckling analysis and response spectrum analysis has been carried out. The section design has been carried out for computed internal forces.

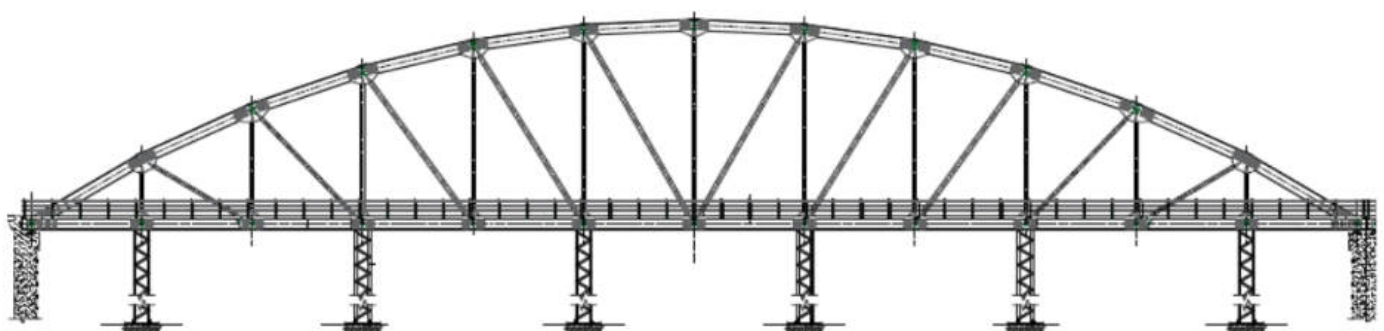
4.4 Construction Sequence

Truss erection has been carried out using staging in site method with the use of temporary steel stanchions as shown in Fig.4. The

construction sequence is:

- (a) Abutment construction
- (b) Erection of temporary steel stanchions and bearing placement.
- (c) Truss erection: bottom chord, cross girder, stringer, bottom bracings, vertical members, top chords, top bracing etc
- (d) Formwork (for deck) construction
- (e) Reinforcement placement and concreting
- (f) Wearing course construction
- (g) Construction of expansion joints and appurtenances
- (h) Construction of MSE walls for approach road

The construction sequences are shown in Fig.5.





(a) Bridge axis



(b) Construction of abutment



(c) Truss erection- Bottom chord, cross girder and stringer



(d) Truss erection-remaining portion



(e) Truss erection-remaining portion



(f) Construction of wall (12.7 m)



(g) Deck reinforcement



(h) Deck concreting



(i) Completed Bridge

Fig.5- Construction sequence and photograph of Bridge Site

4.5 Conclusion

Successful construction of this bridge is the milestone for construction of motorable Bowstring steel truss bridge in Nepal. The Nepalese Engineers has gained a lot of knowledge and confidence after constructing this bridge. The replication of construction of such type of bridge in other location in Nepal is highly recommended where the site demands. Such bridge has advantage in Nepalese topography since the construction does not demand construction of pier in narrow deep gorge, work can be carried out in all seasons and flood has less effect on bridge.

5. Road Safety Status in Nepal

-Er Krishna Nath Ojha, SDE, DoR

*** Background**

In Global Context, Road Safety is a critical theme and number of deaths on the world's roads remains unacceptably high, with an estimated 1.35 million people dying each year. Road accident became the 8th leading cause of death globally and 3 times higher deaths rate in low income than in high income countries. First cause of death among children aged 5-29. Low-income countries having 9% population bear 1% vehicles of world's vehicles but 13 % of all death and high-income countries with 15% population bear 40% of the world's vehicles but 7% of all death. Low- and middle-income countries bear a disproportionate burden of road traffic deaths. 54% of deaths are pedestrians, cyclists and motorcyclists and every 24 seconds someone dies on the road.

In Nepalese Context, the road safety strategy is Safe road-infrastructures and services backed with effective post-crash response and conducive environment resulting in little or no casualties from the RTAs. A National Road Safety Council was set up in Nepal during the nineties but this body has been defunct and road-safety did not receive the due priority it demanded. Comparing the road traffic fatalities with the cumulative number of vehicles registered in the country up to 2019/20 (i.e. 3,987,267), Nepal's fatality rate in 2019/20 was 5.56 per 10,000 registered vehicles and 7.88 per 100,000 populations, which, is still the higher rate in both Asia and the world. Involvement of vehicle in accident: Two wheelers 39.23%, Car/Jeep 28.29%, Truck/Bus 12.31% & others 8.07%. Accidents with respect to cause of accident seems to be Driver's Negligence 72.32%, High Speed 14.66%, overtake 1.64%, Drink and Drive 2.99%, Overload 1.39%, Passenger 1.93%, Vehicle Condition 1.69% & Others 3.38%. Vehicle Composition is Two wheelers 72.24%, Car/jeep 9.60%, Tractor 4.11%, Bus/Truck 4.72% & others 9.86%. Annual loss due to Road crashes approx. US\$ 11 million.

*** Factors leading to the road accidents and resultant fatalities**

Human factors, road condition, advertisement boards, service stations, parking problems, no proper lighting system in street, less space for non-motorized transport, road encroachment, confusing traffic signs, road markings not maintained, weather conditions, careless cycling and walking on roads, vehicle condition like high beam headlight at night, back light not in condition, horn not used in curves,

*** Some Initiatives adapted to reduce road fatality:**

Formation of Road Safety Council 2017, Comprehensive Driving License Test, Institutional establishment in concerned agencies, Road safety awareness among all stake holders, In-house trainings, Initiation of dedicated budget head for road safety. Road Safety Action Plan 2013-2020 is implemented. Road Safety Audit Piloted in large projects funded by ADB/WB during 1995-1997AD, Road Safety inspection done in strategic Roads, Speed limit law/Drink driving law/Helmet law/Seat belt law implemented, Time card system, Trauma center one in Kathmandu capital of country, Vehicle Fitness Testing Center One in Kathmandu.

*** Guidelines and enforcement on Road Safety**

- Nepal Road Standard 2014
- Road Maintenance Manual, DoR
- Standard Specification for road and Bridges
- Traffic Sign and Signals Design Manuals
- Traffic Sign Manual Volume I & II
- Road Safety notes
- Road users Guide
- RA-IMS Started from DoTM
- Use of Radar Gun to check speed
- Use of breathalyzer
- National Transport Policy 2058
- Roads Board Act 2058
- Public Roads Act, 2031 Labor Act 2049
- Heavy Vehicle Management Policy 2005
- Guideline on workshops and repair centers
- Guidelines on bus route allocation
- Guidelines on loading control of goods vehicles
- Guidelines on operation of driver training centers
- Guidelines on vehicle fitness inspection and testing
- Guidelines on vehicular emission test
- Guidelines on bus body building
- Guidelines on school buses
- Do not drink and drive program
- 35-50 thousand drivers are fine per year in Ktm
- Penalty + license punching
- Need to take one-day class about traffic rules
- Time card system: For speed Control

*** Nepal's Commitments to the Global Community on Road Safety**

- 1958: Agreement on Vehicle Regulations
- 1968: Convention on Road Traffic
- 1968: Convention on Road Signs/Signals
- 2007: Busan Declaration
- 1975: Agreement on Minimum Requirements for Driving Permits
- 1997: Convention on Technical Inspection of Vehicles
- 1998: Convention on Global Vehicle Regulations
- 2018: WHO Voluntary Targets
- 2020: Stokhome ministerial summit

*** Road Accident Data of previous years**

Year	Total Vehicle	Total Death	Serious Injury	Normal Injury	Vehicle in Accident	Death per 10000 Vehicle	**Population in 100000	Death Per 100000 Population
2015/16	2326763	2006	4182	8213	16502	8.62	272.6	7.36
2016/17	2768571	2384	4250	8290	16515	8.61	276.3	8.63
2017/18	3193512	2541	4144	8247	18034	7.96	280.9	9.05
2018/19	3503077	2789	4376	10360	22087	7.96	283.4	9.84
2019/20	3987267	2255	4617	11225	25789	5.56	286.0	7.88
2020/21	*4226503	2500	6448	18600	33135	5.92	298.3	8.83

*Forecasted data taking 6% growth rate,

**<https://www.worldometers.inf>

*** Conclusions:**

Road Traffic Accident (RTA) related fatalities and injuries continue to be an important morbidity and mortality problem, as well as a health finance problem. Age is another major cause of accidents; 15 - 45 years' age group is found to be the vulnerable group and most of the deaths were among occupants, motorcyclists, pedestrians, and the productive workforce. Developing the standard roads to a 3-star or better is required to achieve the SDG target of halving road deaths and injuries. From law enforcement data of Kathmandu valley percentage of road traffic rule violators is 27.28 i.e. about one third drivers did not obey the traffic rules in the valley.

*** Recommendations:**

- Education, Engineering and Enforcement are the major sectors to reduce the rate of accident. With due priority we should focus on them and for this several activities may be implemented by allocating sufficient dedicated budget on road safety.
- The upcoming revised Nepal Road Safety Action Plan 2020-2030 to be realistic, implementable from all concerned agencies by harmonizing the vehicle management acts/regulation/guidelines/policies with the UN conventions, international agreements on road-safety and strict implementation of them.
- Need to develop the network based accident data recording/ dissemination system and conduct researches on road safety countermeasures on all roads and implement the suggestions. Should Insure the road safety measures during design and implementation of roads by introducing mandatory provision of safety audit and implementation of the recommendations.
- Need to explore for mass passenger transportation system. Introduce mandatory provisions for work zone safety planning in the construction contracts. Need to conduct skill development Training in safe-roads and awareness programs regularly and adopt scientific licensing and route permits techniques. Adopt the policy of importing safer vehicles.
- For post-crash response, set up a network of ambulance services along the major highways, urban and rural roads providing trauma-care training to medical personnel at all levels with expertise on treatment of road accident victims.

- Adopt mandatory provision of minimum parking area requirement in all residential/public/commercial buildings, pay parking policy, control street vendors and road encroachment.
- We should include road safety and a safe system approach as an integral element of land use planning, road design, transport system planning, education and governance and develop methodology to prioritize investment in road safety projects considering technical, economic and social issues as parameters. Need to control overloading of freight trucks through installation of weighing stations at border crossing points and along major trade corridors with network based overloading detection and information system.

6. Self Compacting Concrete for Pile Foundation

-Er. Prabhat Kumar Jha, DDG, Maintenance Branch

6.1. Introduction

Self-compacting concrete (SCC) is an innovative concrete that does not require vibration for placing and compaction. It is able to flow under its own weight, completely filling formwork and achieving full compaction, even in the presence of congested reinforcement. The hardened concrete is dense, homogeneous and has the same engineering properties and durability as traditional vibrated concrete. In Self-Compacting Concrete, superplasticisers provide the fluidity, and Viscosity Modifying Admixtures (VMA) are used to help reduce segregation, and sensitivity of the mix due to variations in other constituents, especially to moisture content.

VMA's are hydrophilic, water-soluble polymers having high molecular weight. Such polymers can form a network of large molecules extending throughout the mass. The dimensions of the polymers or particles are in colloidal range; hence these are called 'colloidal admixtures'. These can also be used as 'anti-washout' admixtures for underwater placement. Concrete that requires little vibration or compaction has been used in Europe since the early 1970s but self-compacting concrete was not developed until the late 1980's in Japan and in Europe it was probably first used in civil works for transportation networks in Sweden.



Fig. 1 : Use of SCC for thin slab (Source : The European Guidelines for Self-Compacting Concrete, 2005)

6.2. Use of Chemical admixtures

Chemical admixtures and superplasticisers conforming to IS:9103 may be used. Compatibility of the superplasticiser with the cement and any other pozzolanic or hydraulic additives as covered in section 3 being used, should be ensured by trials, so that the following problems are avoided:

- Large dosage of superplasticiser required to achieve the desired workability,
- Excessive retardation of setting,
- Excessive entrainment of large air bubbles,
- Unusually rapid stiffening of concrete,
- Rapid slump loss, and
- Excessive segregation and bleeding

6.3. Use of Mineral admixtures

The following mineral admixtures may be used in concrete to improve its performance:

- (a) Fly ash conforming to Grade-I of IS 3812. The proportion should not be less than 20 percent nor should exceed 35 percent of the total mass of Ordinary Portland Cement and fly-ash.
- (b) Ground Granulated Blast-Furnace Slag (GGBS) conforming to IS 12089. The proportion should not be less than 50 percent nor should exceed 70 percent of total mass of Ordinary Portland Cement and GGBS.
- (c) Silica fume conforming to IS 15388. Silica fume should be very fine, non-crystalline SiO_2 , obtained as a by-product of Silicon or Ferro-Silicon alloy industries

6.4. Properties in the Fresh State

The filling ability and stability of self-compacting concrete in the fresh state can be defined by four key characteristics. Each characteristic can be assessed by one or more test methods (Table 1)

Table 1: Characteristics of SCC and Tests

Characteristics	Preferred Test Method(s)	Limit of Test Value
Flowability	Slump-flow test	550 – 850 mm
Flowability	T_{500} Slump flow test	2 sec
	V-funnel test	8 – 25 sec
Passing ability	L-box test	0.8
Segregation	Segregation resistance (sieve) test	15 – 20 per cent

6.5. Requirement of design mixes

Trial : Mixes Trial mixes shall be prepared using sample of approved materials for the initial design. Additional trial mixes and tests shall be carried out during production in case any changes in the properties of fresh concrete and/or strength of hardened concrete on the basis of early age tests, are observed, so as to control and bring the quality of concrete within acceptable limits. In case of any change in the source of materials, or properties of materials, the design of mix shall be newly established.

Procedure for Design of Mix: Procedures as per any national code or any procedure established by practice for arriving at the suitable mix design, can be followed. Where earlier experience of concrete made from the selected materials is available, the same can provide the basis for the start of the mix design. The target mean strength of concrete shall exceed the specified characteristic strength by at least the margin (called current margin) taken as 1.645 times the standard deviation of sample test results taken from at least 30 separate batches of concrete of nominally similar proportions produced at site by the same plant under similar supervision, over a period exceeding 5 days, but not exceeding one month. Where sufficient data as above to establish the standard deviation is not available, the current margin for the initial mix design shall be taken as 10 MPa, (i.e. standard deviation as 6 MPa) for normal and uniform conditions of quality controls. This initial current margin shall be used only until sufficient data are available to determine the current margin as described above.

6.6 Mix Design

There is no fixed method of mix design for SCC. Mix proportions are to be selected by trials and tests, till a satisfactory mix is arrived at. EFNARC Guidelines 2005 suggest broad outline, as given below:

- Coarse aggregate content - 750 – 1000 kg per m³ of concrete,
- Total powder content – 380 to 600 kg per m³ of concrete,
- Water/powder ratio by solid volume – 0.85 to 1.10,
- Water content – 150 – 210 litres/ m³,
- Paste volume – 300 – 380 litres/ m³,
- Water/cement ratio selected for strength and durability requirements,
- Sand content to balance the remaining volume, usually 48 – 55 % of total aggregate by weight

Paste:- The fraction of the concrete comprising powder, water and air, plus admixture, if applicable

Powder (Fines):- Material of particle size smaller than 0.125 mm NOTE: It includes this size fraction in the cement, additions and aggregate

6.7 Acceptance Criteria

(a) General

Acceptance or rejection of concrete is mostly based on compressive strength. However, other properties of the concrete in fresh and hardened states including durability are also important. Apart from meeting the acceptance criteria given below, concrete is liable to be rejected if it is porous or honey-combed, its placing has been interrupted without providing a proper construction joint, the reinforcement has been displaced beyond the tolerances specified, or construction tolerances have

not been met. However, the hardened concrete may be accepted after carrying out suitable remedial measures.

(b) Compressive strength

When both the following conditions are met, the concrete shall be deemed to comply with the specified compressive strength:

- (a) The mean strength determined from any group of four consecutive non-overlapping samples shall exceed the specified characteristic compressive strength by 10 MPa. (b) Strength of any sample is not less than the specified characteristic compressive strength minus 3 MPa. Concrete of each grade shall be assessed separately. If the concrete is deemed not to comply as per the above criteria, the structural adequacy of the bridge elements affected shall be investigated and any consequential action as needed, shall be taken.

7. Selection of Candidate Roads for Periodic Maintenance under Strategic Roads Connectivity and Trade Improvement Project (SRCTIP)

-Er. Rajendra Raj Sharma-Technical Advisor for
Road Asset Management

7.1 Background

For the improvement of efficiency and safety of selected transport infrastructure, improve the efficiency of cross-border trade, and strengthen the capacity for strategic road network management in Nepal, the Government of Nepal has received a loan from the International Development Association (IDA, The World Bank). It is being implemented in the form of a project called Strategic Roads Connectivity and Trade Improvement Project (SRCTIP).

SRCTIP has following four components:

- Trade facilitation component
- Regional Roads connectivity component
- Institutional Strengthening Component
- Contingency Emergency Response

All of the above components except the Trade Facilitation Component, which is implemented through Ministry of Industry and commerce (MOIC), are implemented through the Ministry of Physical Infrastructure and Transport (MOPIT). The road network in Nepal has substantially increased within the last decades reaching about 80000 km in 2021. About 20% of these roads (15000km) come under the jurisdiction of the Federal Government. These roads come under the responsibility of the DOR. Keeping the network in a good condition by proper maintenance has been becoming challenging day-by-day with the increase in the size of the network. Out of the various types of road maintenance works, periodic maintenance (done in a cycle of 5-8 years for improving the service quality) is the most fund-consuming and has become most crucial. The periodic maintenance of some important roads is planned to be undertaken under the component 3 (Institutional strengthening)

of the SRCTIP. The project will support periodic maintenance of **3400 lane-km** of high traffic Strategic Roads Network (SRN¹). For the management of periodic maintenance of roads under SRCTIP these highly trafficked roads are grouped under the name Core Roads Network (CRN). Road sections in which the level of traffic is more than 2000 Passenger Cars Units (PCU's) excluding motorcycles and non-motorized transport are included in the CRN. At the initial stage the CRN is selected based on the traffic count data of the year 2020. The list of CRN roads may change slightly with time as the traffic on these roads change. It is suggested to update the list on a 2-year interval. The periodic maintenance program on the CRN will be carried out for five years. The cost of carrying out periodic maintenance works is estimated to be USD 80 million for 5 years. Seventy percent of the total cost (USD 56 Million) will be financed through the IDA loan and thirty percent (USD 24 Million) by the GON. Annual cost will be USD 16 million each year. Average length of the road per year for periodic maintenance under SRCTIP will be **680 lane-km**. With the implementation of the periodic maintenance program it is expected that more than 80% of the Core Road Network will be in Good condition at the end of five years.

7.2 Selection criteria

Every year DOR carries out pavement condition survey (SDI-Surface Distress Index and IRI-International Roughness Index) and Traffic count survey on all strategic roads. A master list of all candidate roads and links for periodic maintenance (maintainable roads) is prepared by each division during the preparation of Annual Roads Maintenance Plan (ARMP) showing all link numbers, sections in each link, traffic volume in each section, terrain type, Surface distress index, strategic importance of the road, surfacing history. For each section from the master list the time interval for resealing (in years) is determined based on the Surface distress condition, terrain type and traffic (see Standard Procedure for Periodic Maintenance planning, 2005 approved by the DOR).

All the roads with the age of surfacing less than the time interval for resurfacing (Periodic Maintenance) do not need any periodic maintenance this year, hence they are screened out from the master list. Road sections that are included in other projects or heavily damaged and not suitable for periodic maintenance from visual observation are also further removed from the screened list. The remaining list of road sections that need surfacing this year are then ranked based on the index derived from the traffic, surface condition and the strategic importance of that section.

1. SRN is the earlier classification of network of roads of national importance, which included Highways and Feeder Roads (designated as H and F respectively followed by a number e.g. H05, F70 etc.). After the switching of the state to a federal structure many of the SRN are included in the National Highway system (designated by NH followed by a number).

All the sections are then ranked based on the overall ranking index. All these sections of the road are then sorted from highest index to the lowest index. The roads sections thus sorted are included in the list of roads for periodic maintenance from the top to the bottom until the available budget for the maintenance for the given year is exhausted. The list thus prepared becomes the final list for periodic maintenance for the respective year.

After the selection of all roads for periodic maintenance the selection process for the roads to be included in the SRCTIP is separated taking only the CRN roads out of them. The cost of periodic maintenance for all selected road sections of the CRN only for each division is then worked out. If the total cost of periodic maintenance of CRN road sections within a Division comes out to be less than NPR 50 million, then this is considered a small work and it will be excluded from the SRCTIP and the maintenance works are carried out from the internal resources of the division itself. Economic analysis of the periodic maintenance works on the selected sections is not yet carried out in the DOR. This factor can be considered in the future after incorporating this in the standard procedure of the DOR.

Two options are usually adopted for periodic maintenance viz. surface dressing (SD) and Asphalt Concrete (AC) Overlays. Selection of the periodic maintenance process from these two options is usually done based on the traffic volume on the selected roads (DOR Guideline). From the DOR Guidelines we can adopt either Surface Dressing or asphalt concrete within a range of 1250 ADT to 2000. Since our Core Road Network is selected for traffic volume of more than 2000, we can adopt asphalt concrete overlay for all. However to select a more economic option and from the common logic, if the existing surface is surface dressed then the treatment selected is also Surface Dressing. Hence Asphalt Concrete overlay is selected for links of Mahendra Highway and some other important highways e.g. Bhairahawa Belhiya road.

A special situation is created this year for selection of roads based on the traffic count. Traffic count data of year 2021 has been taken for the analysis. The DOR carries the traffic count survey on 160 selected stations spread throughout the country. The traffic count on some Core Roads Network has shown smaller than previous year's traffic. This is due to the decrease in the travel during Covid-19 pandemic.

7.3 Cost estimation

As mentioned above, two options for periodic maintenance are considered: Asphalt Concrete Overlay and Surface Dressing. The surfaces to be treated with these options are first brought to a level and defects free surfaces by applying pretreatment works e.g. patch repairs and crack sealing works. In addition to this some minor repair works of structures e.g. side drains, walls and shoulders are also carried out. The costing of the works is

done based on the DOR Norms with unit rates calculated from the rates determined by the government at each districts. During estimation of the cost of pretreatment and other minor works a ceiling is fixed that should usually not exceed 30% of the pavement works. For estimating the costs for budget planning following procedure is adopted:

A Road Division Office is selected as a standard for the detailed analysis of the rates for various works. For all other offices the rates are worked out by multiplying by some coefficients to the standard divisional rates. Road Division, Bharatpur is taken as standard. These standard rates are as follows (Table 1):

Table 1: Basic Rates

Standard Rate of AC overlay, NPR/sqm	Rate of pretreatment works, NPR/sqm	Total cost of AC overlay including pretreatment	Standard Rate of SD overlay, NPR/sqm	Rate of pretreatment works, NPR/sqm	Total cost of SD overlay including pretreatment
863.61	102.39(11%)	966.00	318.18	71.82(18%)	390.00

For all other divisions the rates are calculated as follows (Table 2):

Table 2: Divisional Rates

S.No.	Division Name	Coefficient	Total Rate(AC option), NPR/sqm	Total Rate(SD option), NPR/sqm	Remarks
1	Baglung	1.05	1,014.00	409.00	
2	Baitadi	1.05	1,014.00	409.00	
3	Bhaktapur	1.1	1,062.00	429.00	
4	Bharatpur	1	966.00	390.00	
5	Biratnagar	1	966.00	390.00	
6	Butwal	1	966.00	390.00	
7	Chandranigahapur	1	966.00	390.00	
8	Charikot	1.1	1,062.00	429.00	
9	Chaurjahari	1.1	1,062.00	429.00	
10	Damak	1	966.00	390.00	
11	Damauli	1.05	1,014.00	409.00	
12	Dang	1	966.00	390.00	
13	Dhankuta	1.05	1,014.00	409.00	
14	Doti	1.05	1,014.00	409.00	
15	DSBP	1.05	1,014.00	409.00	
16	Harkapur	1.1	1,062.00	429.00	
17	Hetauda	1	966.00	390.00	
18	Ilam	1.05	1,014.00	409.00	
19	Janakpur	1	966.00	390.00	
20	Kathmandu	1.1	1,062.00	429.00	
21	Khalanga	1.1	1,062.00	429.00	
22	Khurkot	1.05	1,014.00	409.00	

23	Lahan	1	966.00	390.00	
24	Lalitpur	1.1	1,062.00	429.00	
25	Mahendranagar	1	966.00	390.00	
26	Nepalgunj	1	966.00	390.00	
27	Nuwakot	1.05	1,014.00	409.00	
28	Palpa	1.05	1,014.00	409.00	
29	Pokhara	1.05	1,014.00	409.00	
30	Pyuthan	1.05	1,014.00	409.00	
31	Sanphebagar	1.1	1,062.00	429.00	
32	Shivapur	1	966.00	390.00	
33	Surkhet	1.05	1,014.00	409.00	
34	Tumlingtar	1.1	1,062.00		

7.4 First Years' Program

In the first year (2020/21) following roads are already included and contracted out for the periodic maintenance program: The

progresses at the end of November 2021 is also shown in the Table 3.

Table 3: First Year Periodic Maintenance Program

S.No.	Division/Project Name	Contract Identification Number	Estimated Amount, NPR (with VAT)	Contract Amount, NPR (With VAT)	Work to be completed on
1	Bhaktapur	SRCTIP-DOR-WPM-RDBKT-NCB-01	136,996,966.94	136,192,933.34	2022-05-15
2	Biratnagar	SRCTIP-DOR-WPM-RDBRT-NCB-02	141,797,194.57	93,110,003.52	2022-07-19
3	Chandranigahapur	SRCTIP-DOR-WPM-RDCHN-NCB-03	104,060,276.13	102,782,534.80	2022-04-30
4	Charikot	SRCTIP-DOR-WPM-RDCHR-NCB-04	109,140,412.83	107,688,092.60	2022-05-14
5	Dang	SRCTIP-DOR-WPM-RDDNG-NCB-05	104,210,709.16	78,180,826.93	2022-04-13
6	DSBP	SRCTIP-DOR-WPM-RDDSB-NCB-06	146,835,906.35	116,870,920.08	2022-06-24
7	Kathmandu	SRCTIP-DOR-WPM-RDKTM-NCB-07	149,604,795.34	118,583,934.75	2022-06-13
8	Mahendranagar	SRCTIP-DOR-WPM-RDMHN-NCB-08	96,539,982.09	96,129,505.13	2022-07-03
9	Nepalgunj	SRCTIP-DoR-WPM-RDNPL-NCB-09	80,422,467.30	79,049,656.35	2022-04-13
10	Pokhara	SRCTIP-DOR-WPM-DROPKR-NCB-10	159,326,109.03		
11	Surkhet	SRCTIP-DOR-WPM-RDSRK-NCB-11	111,807,488.10	111,223,379.53	2022-09-07

All the work contracts of periodic maintenance works shall be administered by the respective maintenance divisions of the DOR. To assist the divisions to supervise the works a consultants' team (Project management consultant, PMC) will be hired by the maintenance branch of the DOR. The hiring process is almost complete with the final evaluation work going on. The consultant's team will be in place by the mid of December 2021. Until the procurement of the PMC, the divisions are being

assisted by a team comprising of the Maintenance Advisor and engineer's team from the Quality Research and Development Centre (QRDC) of the DOR.

7.5 Second Years' Program

For the second year periodic maintenance program following roads are selected. The details of the selection outcome is summarized in the Table 4.

Table 4:Second Year Periodic Maintenance Program

Link Code	Road Division	Section From (Km)	Section To (Km)	Adopted Section Length (Km)	Lane-km	Treatment type	For Budgeting Total Estimated Cost (NPR '000)	Cost of Pre Treatment Works only (NPR '000)
NH01-034	Bharatpur	457.78	461.78	4.46	8.93	AC	36,330.00	3,996.30
NH44-002	Bharatpur	30.45	31.95	1.50	3.00	AC	16,950.00	1,864.50
	Bharatpuzr Total			5.96	11.93		53,280.00	5,860.80
F05401	Biratnagar	0.00	8.00	8.00	16.00	SD	17,520.00	3,153.60
F06001	Biratnagar	0.00	19.35	19.35	38.70	SD	48,560.00	8,740.80
NH01-006	Biratnagar	54.75	63.45	8.70	17.40	AC	70,800.00	7,788.00
	Biratnagar Total			36.05	72.10		136,880.00	19,682.40
F00901	Butwal	0.00	8.95	8.95	17.90	SD	20,420.00	3,675.60
F00902	Butwal	8.95	18.95	10.00	20.00	SD	22,820.00	4,107.60
NH47-001	Butwal	0.75	1.50	0.75	1.50	AC	27,630.00	3,039.30
NH47-001	Butwal	1.50	2.20	0.70	1.40	AC	25,790.00	2,836.90
NH47-001	Butwal	2.20	4.80	2.60	5.20	AC	95,800.00	10,538.00
NH47-003	Butwal	22.11	24.04	1.93	3.86	AC	71,110.00	7,822.10
	Butwal Total			14.93	29.86		263,570.00	32,019.50
NH03-017	Harkapur	466.34	473.34	7.00	14.00	SD	13,180.00	2,372.40
NH20-006	Harkapur	102.13	116.33	14.20	28.40	SD	24,950.00	4,491.00
NH20-007	Harkapur	137.33	158.04	20.71	41.42	SD	36,380.00	6,548.40
NH20-008	Harkapur	158.04	195.04	37.00	74.00	SD	65,000.00	11,700.00
	Harkapur Total			78.91	157.82		139,510.00	25,111.80
NH01-012	Lahan	134.93	140.95	6.02	12.04	SD	19,780.00	3,560.40
NH01-013	Lahan	140.95	150.95	10.00	20.00	SD	32,850.00	5,913.00
	Lahan Total			16.02	32.04		52,630.00	9,473.40
NH47-005	Palpa	35.20	42.50	7.30	14.60	SD	19,210.00	3,457.80
NH47-005	Palpa	42.50	55.59	13.09	26.18	SD	34,450.00	6,201.00
	Palpa Total			20.39	40.78		53,660.00	9,658.80
NH58-007	Surkhet	74.00	80.60	6.60	13.20	SD	15,790.00	2,842.20
NH58-010	Surkhet	112.99	140.10	27.11	54.22	SD	54,490.00	9,808.20
NH58-012	Surkhet	165.99	174.99	9.00	18.00	SD	18,090.00	3,256.20
	Surkhet Total			42.71	85.42		88,370.00	15,906.60
	Grand Total			214.97	429.95		787,900.00	117,713.30

7.6 Environmental and Safeguard Screening

Environmental and Safeguard Screening is done for all selected

roads. There are no environmental and social issues for implementing the periodic maintenance on selected roads.

8. Status of Postal Highway Project

-Postal Highway Directorate Office, DoR

8.1 Introduction

Road transportation infrastructure is the backbone of overall growth of a country. This sector must be reinforced and enhanced in order to go forward with the economic and social development of a landlocked and geographically diverse country like Nepal. It is necessary to create and extend physical infrastructures like roads and bridges in order to provide simple, easy, and accessible travel to road users by developing national highways and a road transport network. By contributing to the country's economic, social, and cultural progress, the national road network will surely play a significant part in fulfilling the government of Nepal's motto "Prosperous Nepal, Happy Nepali."

Accepting this necessity and their accomplishments, the Postal Highway Project with the goal of constructing 975 km Postal Highway on the southern region of Terai Madesh from Mechi in the east to Mahakali in the west, was created by including 21 districts of Terai with the intention of balancing development of overall sectors of Terai Madesh including economic, social, cultural, tourism, and educational sectors by connecting the districts of Terai Madesh terrain of Nepal to the transportation network. It is the oldest highway in Nepal constructed by Juddha Shumsher Jung Bahadur Rana & Padma Shumsher Jung Bahadur Rana to aid transportation and facilitate postal services throughout the nation. Since the F.Y. 2066/67, 817 km of other subsidiary roads, totaling 1792 km, have been running with expenditures carried by Nepalese internal resources with the cooperation of the Indian government.

Terai Madesh, which covers about 17% of Nepal's total land area and stretches from 58 to 300 meters above sea level, is not only home to half of the country's people, but also serves as an industrial and economic hub. From the time of the Rana Regime, the road that has been used as a postal road to deliver letters passing through Terai Madesh residences from Mechi in the east to Mahakali in the west was envisioned by the Nepal government to be developed as an East-West Postal Highway in order to expand and develop the road network. This project, which connects 21 Terai Madesh districts and the bulk of Terai Madesh residential regions, appears to give direct transportation to 8 million people. After the completion of this highway, the country's economic and social growth will proceed, and the living-standard of the people will appear to rise as fundamental requirements such as education, health, and clean drinking water are met. Because this highway's alignment seeks to connect cities in Terai districts as well, a considerable boost in the general public's living standard is projected as a result of increased economic activity and the establishment of new job possibilities in the region. Because there are tourist attractions in the area of this project that have been unable to market and

expand owing to a lack of transportation infrastructure, the economy will become more dynamic as a result of an increase in internal and external tourism. With the expectation that the Postal Highway will be a transformational project based on all of these indicators, the Nepal government has designated the project as a "National Pride Project" since F.Y. 2069/70. After the project is completed and all road sections have been blacktopped, as well as the construction of all proposed bridges, this project will become an alternative to the currently operational East-West Highway, providing unobstructed transportation from Mechi in the east to Mahakali in the west, passing through Terai Madesh's southern territory. Then, by establishing itself as a backbone in the Route Network Sector, this road is projected to be proven as a milestone that opens doors to all potential growth.

8.2 Salient Features

S.N.	Design Parameters	Double Lane
1	Technical Classification as per NRS 2070	Class II & III.
2	Right of way	15 m (On either side from center line).
3	Carriageway Width	7.0 m.
4	Shoulder Width	2.0 m. on each side.
5	Total Formation Width	11 m.

8.3 Alignment Details (Fig. 1)

Starting Point: Starting from Mechi Bridge (Bhadrapur, Nepal India Border) at eastern part of Jhapa district and reaching Dodhara (Nepal India Border) of Kanchanpur district, has received approval to pass through following mentioned places from Nepal Government.

Province No. 1: Mechi Bridge (Bhadrapur), Ratuwa, Keshaliya, Laukahi (Pulchowk), Koshi Barrage (Marama)

Province No. 2: Koshi Barrage (Marama), Bhardah, Kanchanpur, Rajbiraj, Walan, Kamala, Janakpur, Basbitti, Hardi, Malangawa, Bagmati (Badarhawa), Maheshpur, Aaruwa, Kalaiya, Bara, Birjung, Amuwa Post.

Province No. 3: Aamuwa Post, Madi Riwa Khola, Jagatpur, Bahuban.

Province No. 4: Bahuwan, Triveni

Province No. 5: Triveni, Baruwa, Narayanchowk, Parasi, Mowa, Bhairhawa, Lumbini, Kothi, Taulihawa, Bahadurjung, Ramnagar, Charai Naka, Kalakote, Gobardiha, Gadhwara, Rajpur, Gothuwa, Kumbar, Betahani, Nepaljung, Mankhola, Gularia, Kothiyaghat, Rajapur, Karnali (Sati)

Province No. 7: Karnali (Sati), Dhangadi, Kanchanpur Border, Kajagaun, Dodhara.

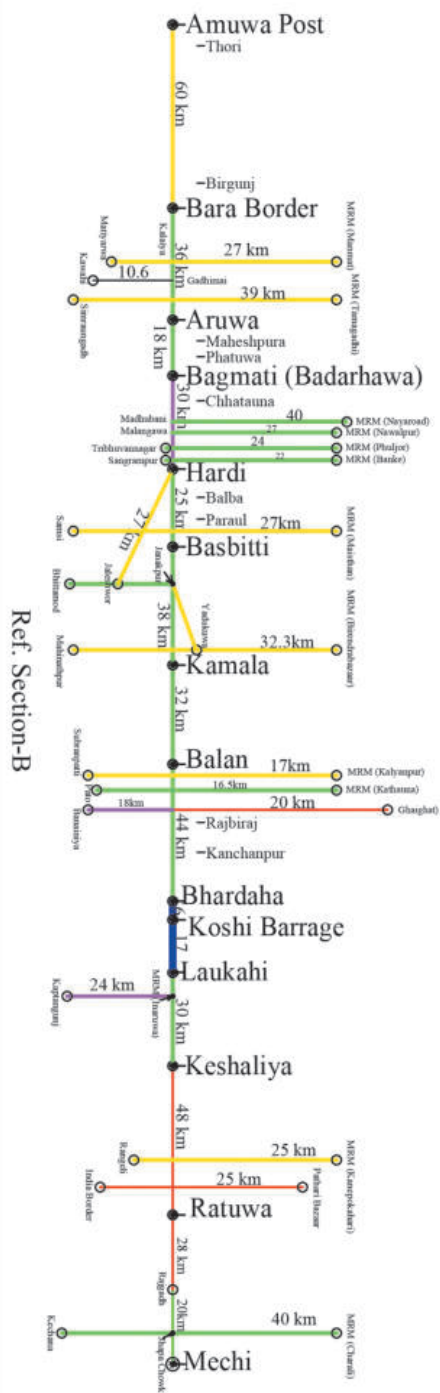


Fig.1: LINE DIAGRAM OF POSTAL HIGHWAY PROJECT

(EAST WEST AND NORTH SOUTH TRUNK ROADS)



9. Photoraphs of Some Major Works of Fiscal Year 2078/79



Pushpala (Mid-Hill) Highways, Pokhra-Hemja Road Section



Karnali Arch Bridge, Kachalighat, Kuine (Under Construction)



Dhalkebar-Janakpur Six Lane Road, Dhanusha Ch: 22+080 to 24+720 (Mahendranagar-Dhalkebar section)

Advisory Board

Chief Advisor : Shiva Hari Sapkota, DG
Advisors : Shiva Prasad Nepal, DDG
 : Umesh Bindu Shrestha, DDG
 : Ram Hari Pokharel, DDG
 : Bhuwan Adhikari, DDG
 : Prabhat Kumar Jha, DDG

Editorial Board

Chief Editor : Dr. Bijaya Jaishi, SE, FRSMO
Editors : Krishna Nath Ojha, SDE
 : Laxmi Dutt Bhatta, SDE
 : Jibendra Mishra, SDE
 : Saurabh Bajracharya, SDE
 : Jigesh Prasad Chaudhary, Er.

DoR Address: Department of Roads (DoR), Chakupat, Lalitpur, P.No. : 01-5529075

See you again with DoR Newsletter Vol. 29