



**GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT & HIGHWAYS**

*Indian Academy of Highway Engineers,
A-5, Sector-62, Noida – 201301.*

No. RW/NH-34072/1/2015-S&R(B)

Dated: August 18, 2016.

To:

1. The Chief Secretaries of all the State Governments / UTs.
2. The Principal Secretaries / Secretaries of all States / UTs Public Works Department dealing with National Highways, other Centrally sponsored schemes.
3. The Engineers-in-Chief and Chief Engineers of Public Works Department of States / UTs dealing with National Highways, other Centrally sponsored schemes.
4. The Director General (Border Roads), Seema Sadak Bhavan, Ring Road, Delhi 110 010.
5. The Chairman, National Highways Authority of India, Plot G-5 & 6, Sector-10, Dwarka, New Delhi 110 075.
6. The Managing Director, NHIDCL, PTI Building, Sansad Marg, New Delhi 110001.

Sub: Adoption of best practices for economical and durable construction of "Tunnel Structures" – reg.

Sir,

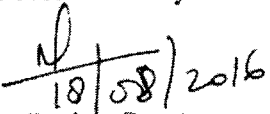
The following practices may be made as part of planning, design, and construction stages for tunnel structures to be constructed on National Highways as far as possible. This circular will come in to effect with issue date of this circular.

1. While framing the detailed project report (DPR) for hilly areas, the possibilities of providing tunnels as an alternative to detours/ circuitous routes need to be explored and may be included in the scope of TOR of consultant.
2. In all landslide prone areas, the provision of artificial cut and cover tunnels of adequate lengths at the location of deep open cuts, outside excavated portals at entrances of bored tunnels and potential slip zones along the alignment of roads shall be kept as an integral part of tunnel work as it helps to avoid blockage due to landslides and resultant hindrance to traffic. It can be dispensed with when the option of cut/open approach cuts coupled with adequate & appropriate protective works is structurally sound/durable and economical. The length of such a cut and cover tunnel beyond the bored tunnel will depend on the local geotechnical conditions, size and shape of tunnel. The portals and approaches shall be designed with adequate care with regard to safety of road users. The cut and cover tunnel could be in cast-in-situ concrete or prefabricated steel frames (or corrugated steel plates). In locations where due to geological conditions, it is not feasible to provide cut and cover tunnel in front of a slip zone, a tunnel going below the slip should be provided.
3. Alignment of the roadway going into and coming out of a tunnel should merge smoothly with the contour. For achieving such smooth merging, appropriate curves should be introduced in the horizontal alignment of the tunnel.
4. In order to trap rainwater running down the hill slopes and prevent it from flowing into the approach cuts and the tunnel, suitable catch water drains shall be provided

drainage shall also be provided along the two sides of open cuts. If possible, invert of the open cuts should be made to slope down away from the portal to prevent rain water from flowing into the tunnel. In the open/approach cuts discontinuous kerbs shall be provided to demarcate the edge of the carriageway. Beyond the kerbs, side drains with adequate waterway shall be provided in the open/approach cuts as per IRC:SP:91.

5. Preconstruction activities like procurement of land required for muck disposal, licenses and permits for storage of explosives and arrangements for construction power need to be arranged by implementing highways authority before award of contracts, as their completion is essential for timely completion of tunnel work.
6. "Drilling and Blasting" is the most common technique used for advancement of tunnel face, except in soft strata and is therefore advised to use it as far as possible due to its economy considerations subject to construction and structural feasibility. Otherwise, the tunnel face shall be advanced by carrying out excavation using techniques and methods suitable for type of strata, stand up time of the strata, type of machinery available and with due regards to size and shape of tunnel as per IRC:SP:91. It is suggested that Road Header may be used for tunnel excavation in populated areas, involving sensitive structures or when unconfined compressive strength (UCS) of rock is less than 120 MPa. Tunnel Boring Machine may be used when UCS is more than 120 MPa.
7. In order to ensure road user safety and comfort inside the tunnels, the installation and maintenance of the following components during the construction of tunnel as well as during in-service period shall be adhered strictly as per IRC:SP:91 specially in long tunnels and it should not be compromised for achieving economy, since it affects the safety of road users.
 - a. lighting and ventilation,
 - b. signal systems and road signage,
 - c. access control systems,
 - d. maintenance of tunnels including preventive maintenance as well as corrective maintenance,
 - e. Incidence and emergencies management for protection against fire, vehicle accidents/breakdown, debris on roads, chemical spillage, leakages inside tunnel etc.
8. Mobile phone service providers shall be encouraged to install transponders inside long tunnels to create uninterrupted connectivity.
9. The content of this circular may be brought to the notice of all concerned in your organization. Feedback on these guidelines may be submitted on yearly basis.
10. This issues with the approval of competent authority.

Yours faithfully.


18/08/2016
(Sanjay Garg).

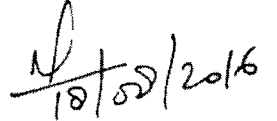
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For Director General (Road Development) & SS.
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Copy to:

1. All Technical Officers in the Ministry of Road Transport & Highways.
2. All Joint Secretaries in the Ministry of Road Transport & Highways.
3. All ROs & ELOs of the Ministry of Road Transport & Highways.
4. The Secretary General, Indian Roads Congress.
5. The Director, IAHE.
6. Technical circular file of S, R&T (B) Section.
7. NIC for uploading on Ministry's website under "what's new".

Copy for kind information to:

1. PS to Hon'ble Minister (SRT&H) / PS to Hon'ble MOS (SRT&H).
2. Sr. PPS to Secretary (RT&H).
3. PPS to DG (RD) & SS.
4. PPS to SS & FA.
5. PPS to ADG-I / AD-II / Coordinators – I/II/III.


18/02/2016

(Sanjay Garg).

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