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Guidelines for reducing noise
pollution created by elevated
roads, flyovers and elevated
rail corridors

GOVERNMENT OF MAHARASHTRA
Urban Development Department
Mantralaya, Mumbai - 400032
Dated :- 26th October 2015

CIRCULAR

No.TPB 4312/208/CR- 20/2013/UD-11

Read .: Circular No. TPB 4308/4011/CR-343/08/UD-11 dated 3rd December, 2008.

BACKGROUND:

Government vide above referred circular issued guidelines for reducing noise pollution generated by elevated roads, flyovers and elevated rail corridors. Based on the experience of various agencies and study of the anti-noise action measures adopted in many advanced countries, it is noted that in typical Indian conditions, significant ambient noise remains at ground level which is due to residual traffic and other activities in adjacent areas. Therefore, it is necessary to bring more clarity to the Circular in terms of noise exposure value limits, overview of acoustic design, acoustic and non-acoustic performances, barrier materials, dimensions and guidelines for ascertaining the performance of the noise barriers. To ensure effective anti-noise actions and a proper noise abatement solution, international standards have been specified as guidelines where required.

It is necessary to implement noise abatement measures to reduce noise from existing and proposed elevated roads, flyovers and elevated rail corridors. Installation of noise barriers are in general considered as direct anti-noise technical remedies. While the onus of mitigating road/rail traffic noise lies with the project's authorities, noise barriers are considered as effective noise mitigation measures. In addition, various other measures like, no-honking zones, speed restrictions, acoustic windows on sensitive locations etc. may also be considered simultaneously as additional measures for better noise mitigation.

In view of the above, the revised guidelines are issued as under:

GUIDELINES:

- 1) The guidelines are applicable for flyovers, elevated roads and elevated rail corridors (hereinafter referred to as elevated corridor).
- 2) Noise exposure values should be evaluated over 24 continuous hours at the external façade of the buildings immediately fronting the elevated corridor. Noise abatement measures shall be undertaken where average hourly noise level expressed as LAeq exceeds 70 dB(A).



- 3) In general, noise reduction below admissible levels is possible only by ascertaining series of complementing noise abatement initiatives and hence realistic ambient noise level reduction may be achieved by installing scientifically designed noise barriers along with other initiatives such as traffic calming, restriction on movement of heavy vehicles, sound-proof windows for sensitive buildings etc.
- 4) In case of proposed elevated corridor, anticipated noise levels post-construction shall be arrived at, by applying latest acoustic engineering practices including noise mapping, modeling, simulation, design etc. Noise abatement measures shall be integrated along with the structural requirements of the project.
- 5) In case of elevated corridor under implementation, anticipated noise levels post-construction shall be arrived at, as above. Noise abatement measures shall be taken up by modifying the structure suitably. Where such modification is not feasible, alternative measures such as traffic calming, restriction on movement of heavy vehicles, sound-proof windows for sensitive buildings etc. shall be undertaken with approval of Competent Authority.
- 6) In case of elevated corridor already constructed, decision of installing anti-noise action devices shall be taken by Competent Authority only after assessing structural stability of the corridor and constructability of anti-noise action devices. In case installation of anti-noise action devices is not feasible on an elevated corridor, it shall be notified for information to the public.
- 7) In all cases (point 4, 5 & 6 above), the noise mapping and future predictions should be done for a minimum period of 20 years.
- 8) For projects already completed or under construction, implementation of noise abatement measures would require time for detailed examination, retrofitting measures and their execution. Considering these, noise abatement measures in such cases shall be implemented within a period of 10 years. The detailed examination to decide whether retrofitting measures will be essential shall, however, be conducted within five years.
- 9) The responsibility of providing noise abatement measures lies with the following:
 - a. For projects under planning or implementation- Implementing Authority.
 - b. For projects already completed – Maintaining Authority or Urban Local Bodies.
- 10) Type, shape and dimensions of the noise barrier shall be decided considering acoustic design as well as non-acoustic aspects. The acoustic design shall include dimensions, locations, shape of barriers and identification of constituting materials. The non-acoustic design shall include aspects such as structural integrity, safety in collision and fire, aesthetics and long term performance.
- 11) The acoustical study shall specify the "Insertion loss" of the noise barrier for all the critical receivers (CR) (Population exposed to noise levels above prescribed limit).



"Insertion loss" of the noise barriers should target to reduce the number of critical receivers by at least 50%. The acoustical and non-acoustical performances of the noise barriers shall be evaluated as per the requirements of EN 1793 and EN 1794 and revisions thereof.

12) Acoustic engineering studies (noise mapping, modeling, simulation, design etc.) shall be done as per latest international procedures and standards (e.g. UNI 11143 - Part 1, 2 & 3, ISO 11819 - 1, Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 or equivalent) and testing of noise barrier materials shall be done by competent agency having suitable infrastructure as approved by Competent Authority.

13) The technical requirements of noise barriers are enlisted in the Schedule, which may be amended from time to time by Government of Maharashtra.

SCHEDULE:

a. The noise barrier's performance is governed by the properties of the material being used. In accordance with the European standards EN 1793 - Part 1 & 2, noise barrier made up of bi-absorptive panels must have a minimum single number rating of sound absorption $DL\alpha$ of at least category A4 (12 to 15 dB) and a minimum single number rating of Sound Isolation DLR (Transmission Loss) of at least category B2 (15 to 24 dB). For noise barrier made up of mono-absorptive panels, $DL\alpha$ and DLR shall be of at least category A4 (12 to 15 dB) and B3 (25 to 34 dB) respectively. In case of noise barrier made up of transparent reflecting panels, acceptable single number rating of Sound Isolation DLR (Transmission Loss) of the panels shall be of at least category B3 (25 to 34 dB). These acceptance criteria shall be followed unless the acoustical design requires different appropriate values for a specific situation.

b. In the design of noise barriers, sound 'leaks' due to holes, slits, cracks or gaps through or beneath a noise barrier shall be avoided to the extent possible.

c. Noise barriers should be designed in such a way to accommodate the street furniture as far as possible. The in-situ acoustical performance of the barrier shall be evaluated according to the requirement of EN 1793-5.

d. In general, the following materials may form components of noise barriers:

- i. Steel
- ii. Aluminum
- iii. Polycarbonate or acrylic sheets (PMMA)
- iv. Concrete, brick or glass fiber reinforced concrete
- v. Expanded clay
- vi. Any other material must have prior approval of Competent Authority

e. Emergency access/ exit points are also required to assist evacuation according to the requirements of EN 1794-2.



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- f. If barriers are in the form of enclosure, it should be uniform and avoid glare and effects. Adequate ventilation shall be provided in such cases.
- g. The barriers properly blend into the local environment. It should also be integrated and co-ordinated with the street furniture.
- h. As far as possible, tall noise barriers shall be avoided. Generally, the height of barriers shall not be more than 4 m, however shall be dependent on the acoustic design. Cantilever barriers may be built instead of very tall barriers.
- i. Noise barriers should be designed so that they require minimal maintenance other than cleaning. Proper access should be provided for future maintenance.

The guidelines shall be followed by MSRDC, MMRDA, MCGM, PWD and other agencies engaged in construction/ maintenance of flyovers, elevated roads and elevated rail corridors.

By Order in the Name of Governor of Maharashtra

(Shirang D. Landge)

Joint Secretary to Government.



Copy to :-

- 1) The Additional Chief Secretary, Public Works Department, Mantralaya, Mumbai
- 2) The Secretary, Urban Development Department-II, Mantralaya, Mumbai.
- 3) The Metropolitan Commissioner, Mumbai Metropolitan Region Development Authority, Bandra-Kurla Complex, Bandra (E), Mumbai.
- 4) The Managing Director, CIDCO, Nirmal Bhavan, Nariman Point, Mumbai.
- 5) The Secretary, Environment Department, Mantralaya, Mumbai.
- 6) The Member Secretary, Maharashtra Pollution Control Board, Kalpataru Point, 3rd & 4th floor, Sion Matunga Scheme Road No.8, Opp. Cine Planet Cinema, Near Sion Circle, Sion (E), Mumbai 400 022.
- 7) Director, Municipal Administration, Andheri (W), Mumbai.
- 8) Director of Town Planning, Maharashtra State, Pune.
- 9) All Municipal Commissioners, Municipal Corporation
- 10) Chief Engineer, Public Works Department, Mantralaya, Mumbai.
- 11) Chief Engineer, Maharashtra State Road Development Corpn. Mumbai.
- 12) Chief, Transport & Communication Division, Mumbai Metropolitan Region Development Authority, Bandra (E), Mumbai.
- 13) Chief Engineer (DP), Municipal Corpn. of Gr. Mumbai, Mumbai.
- 14) Chief, Western Railway/ Central Railway, Mumbai.

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For Necessary Action Please
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LIST OF RELEVANT STANDARDS (to be referred but not limited to):

1. EN 1793 Road traffic noise reducing devices — Test method for determining acoustic performance
2. EN 1794 Road traffic noise reducing devices — Non-acoustic Performance
3. UNI 11143 Method to evaluate the acoustic impact & environment for different kind of sources
4. BS EN 14388 Road traffic noise reducing devices — Specifications
5. ISO 11819 Measurement of the influence of road surfaces on traffic noise



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