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No. RW/NH-33044/1/2007-S&R (R) **Dated, the 24th October, 2007**

To,

The Secretaries (PWD), Engineer-in-Chief and Chief Engineers of State PWDs and UTs (dealing with National Higwhays); The Chairman, National Hihgways Authority of India; The Director General (Border Roads)

Subject: Provision of Traffic Signs (including Variable Message Signs) and Pavement marking on National Highways and other Roads Improved/Developed under Centrally Sponsored Schemes

A Committee was constituted to prepare interim guidelines for Variable Message Signs. The Committee has submitted its report which is enclosed at Annex-I.

2. It is requested that variable message signs as per the interim guidelines may be provided in selected projects on experimental basis and your comments/suggestions/feedback may be sent at the earliest to enable the Ministry to finalize the guidelines.

3. In respect of road signs and road marketings, the recommendations of the Committee are being considered separately.

(Enclosure to Ministry of Shipping, Road Transport & Highways, (Department of Road Transport & Highways), letter No. RW/NH-33044/1/2007-S&R dated 24.10.2007)

Annex-I

Report of Committee for Study of the Applicability of Variable Message Sign (VMS) on NHs Inter-alia for Finalization of Interim Guidelines

1. **Safety Issues in the Country:**

1.1. Road safety on roads in India is amongst the poorest in the world. More than 90,000 lives are lost on Indian roads every year. As per a rough assessment, road accidents cause financial loss to the country to an extent of 2% to 3% of GDP, besides the loss to the individuals and agonies to the families of the victims.

1.2. The earlier thinking that human factor is a major cause of accidents on roads is now changing and it has been now recognized world over that the road system also contributes significantly for human to commit mistakes. The road system, therefore, should be such that it takes into consideration the human failings. Developed countries have been able to bring about considerable improvement in the safety on their road by recognizing this important

aspect and constructing their road system as 'forgiving' as possible.

1.3. In the recent past, with the rapid economic growth in the country, the demand for better facilities and infrastructure has increased. The road system is now getting new attention. Improved roads would lead to increased speeds and enhanced aspirations of the people for a safe and efficient movement.

2. **Earlier Circulars of the Ministry:**

2.1. Traffic signs and road markings are the basic essential tools for guiding the drivers to reach their destination, regulating their movement, cautioning the driver of the dangers ahead and informing the driver for the facilities available enroute. No road should be considered to be fit for the use unless it has been provided with adequate system of traffic signs and road markings.

2.2. Ministry has been issuing circulars, guidelines and instructions from time to time for provision of an adequate system of traffic signs and road markings on National Highways which are equally applicable for other roads. A list of these circulars is enclosed at **Annex-I**. Indian Roads Congress has also published guidelines and Codes of Practices for traffic signs and road markings and for other features of safety on the road, the list of which is at **Annex-II.**

3. **Importance and Principles of Signs and Markings:**

3.1. Road improvement in the country has been taken up on a large scale with the launching of National Highway Development Project (NHDP) under its various phases and State Governments having their own programmes for improvement of state roads. It has been found that though signs and markings are provided on these improved roads but they are still far from the appropriate system to meet the intended requirements of safe and efficient travel. Now that the objective is to develop the national Highway System to a world class standard, it is imperative that all the roads including those which are under improvement/up gradation are provided with a detailed system of traffic signs and pavement markings.

3.2. The traffic signs and markings for promoting highway safety and efficiency have to be effective and should meet the following basis requirements for that objective:

(i) They should fulfill a specific need as per the site situation;

(ii) They should command attention from all categories of road users;

(iii) They should convey a clear, precise meaning in a simple form;

(iv) They should command respect from road users and for this, they should be correct and uniform throughout;

(v) Their placement should given adequate time for a proper response;

(vi) They should be conspicuous to attract attention of the drivers and should be legible from sufficiently far away to be read without diverting the line of sight through too great an angle; and

(vii) They should be placed such that they are not obscured by other objects or vegetation and no clustering has taken place;

(viii) Road markings should be clear and visible during the hours of darkness so that drivers can see them clearly in time to position themselves correctly.

4. **Commonly used signs and marking:**

I. **Mandatory/Regulator Signs:**

- 'Stop' and 'Give Way' signs;
- 'No Parking' and 'No Stopping' sings;

- 'Speed Limit; and Vehicle Control' signs;
- 'No Overtaking' signs
- 'Compulsory Direction Control; and other signs.

II. **Cautionary/warning signs:**

- Curve signs;
- Narrow Bridge/Narrow road;
- Road widens;
- Gap in median;
- Pedestrian crossing;
- School;
- Men at work;
- Cross road/side road;
- T-Intersection/Y-Intersection;
- Major road ahead;
- Roundabout;
- Unguarded Railway Crossing;
- Speed Breaker;
- Reduced carriageway

III. **Informatory Signs:**

(i) **Direction and place identification signs:**

- Advance direction signs;
- Destination sign;
- Place/City identification;

(ii) **Facility Information signs:**

- Public telephone;
- Filling Station (Petrol Pump);
- Hospital;
- Resting Place;

(iii) **Other useful information signs:**

- Airport;
- Bus Stop;

4.2. Some of the important commonly used road markings, as per IRC:35, are listed below:

I. **Longitudinal markings:**

- Traffic lane markings
- Warning lines
- Centre line
- Edge lines
- Bus lane markings
- Cycle lane markings

II. Markings on intersections:

- Give way lines
- Stop lines
- Pedestrian crossings
- Protected right turn lanes
- Direction arrows
- Box markings

III. Markings at hazardous locations:

- Carriageway width transition markings
- Diagonal markings
- Chevron markings

IV. Markings for parking:

- Bus stops
- Parking restrictions

V. Word messages

- Stop
- Bus
- Keep clear
- School

VI. Object marking:

- Objects within and adjacent to carriageway
- Kerb markings

5. **Variable Message Signs:**

5.1. Traffic signs and markings are the basic tools for enhancing safety on road system. Traditionally, fixed message signs are commonly used which could be either kerb mounted or gantry mounted. With extensive use of information and communication technologies in various aspects of road transport and increase in trips with demand for information on real time basis, the signs could be varied as per the traffic conditions. These are called Variable Message Signs. With the advancement of road transport system in the country, it has now become necessary that Variable Message Signs (VMS) are also used on National Highway network as and when and where considered required.

5.2. Intelligent Transport Systems (ITS) is now used worldwide for safety enhencement of existing infrastructure and for its optimal ulilization Advanced Traffic Management Systems (ATMS) is one of the components of ITS. which is provided for management of traffic as well as for providing safety and information on traffic conditions to the user on real time basis. It mainly comprises systems for emergency calls, variable message signs, traffic counting, suveillance, weather monitoring and integration menace of various systems.

5.3. Variable Message Signs (VMS) are quite useful in conveying the traffic conditions ahead to the drivers on real-time basis as well as to display messages to support national road safety campaigns. It may also include the variable traffic speed limit depending upon the requirements.

5.4. Variable Message Signs are capable of displaying several messages in sequence and can be repeated. Such messages can be changed manually, by remote control or by automatic control. Variable Message Signs shall display pertinent traffic operation and guidance information only and not any advertising. Various situations where VMS would be appropriate are as below:

(i) Incidents such as accidents, traffic diversions, incident management, not for work (men at work), adverse weather and road conditions and operation with lane control signals;

(ii) Traveler information such as display of road construction activity in near future, messages for testing of the system and special events that effect the traffic flow:

(iii) Public service announcements like messages relating to driver safety campaign.

5.5. **Technical requirements:**

The system shall use light Emitting Dodes (LEDs)/high gain trans-reflective Liquid Crystal Displays (LCDs) for outdoor ambient sunlight. The system should comply with European Standard EN-12966. The minimum height of character shall be 300 mm so that display is legible from a distance of 200 m. The design and provision of variable Message Signs should be done after careful consideration of its need. Following aspects should be considered:

(i) Collection of preliminary data i.e. intended purpose, type of information to be displayed and alternate diversion routes available;

(ii) Type of VMS i.e. intended purpose, information to be displayed and technology to be used;

(iii) They are visible in all weather conditions including foggy and misty conditions.

5.6. **Fixed VMS:**

Their placement should be as below:

(a) Fixed VMS shall be mounted on a sturdy and aesthetically pleasing gantry structure whereby the vertical clearance of at least 5.5 m is available from the road. Safety barriers shall be provided at gantry support column(s) for their protection and for safety of road users. The concerete pedestal for support column should be flushed with ground but in no case should protrude for more than 15 cms.

(b) The minimum distance of VMS on an expressway should be 1.5 km prior to decision point and that for National Highways it should be 1 km. The signs should be visible from a distance of 300 m. It should not be located on a curvature and on a highway section having grade exceeding 4%.

(c) Location and source of power along the road segment if it is not solar power.

(d) There should be clear distance between existing sign and VMS. On expressways the minimum distance between road signs and VMS should be at least 250 m which should be 150 m on National Highways.

5.7. **Portable VMS:**

The variable message signs can be fixed or portable. Portable signs can be mounted at the back of the truck or similar vehicle. The portable VMS signs mounted on a truck could be powered by solar energy or battery and show the sign of 'men at work' and/or speed limits in the construction zone. Proper placement of a portable VMS is critieal to its effectiveness. The placement must give adequate time to the motorists to react to the message and take corrective action. On Expressways and National Highways placement of these at 2 km. prior to the decision

points should be done with repetition at every 500 m. It should provide a sight distance of 300 m and should not interfere with other traffic control devices. If the portable VMS set-up along the roadway and a message was not to be required for a period of next four hours or more, the sign panel should be turned away from the traffic, parallel to the road centre line. No blank signs should be facing the drivers for an extended period.

5.8. Under no circumstances VMS shall be used for advertising fo any kind. It would be in blank mode when traffic, roadway, environment or pavement conditions or public service announcements do not warrant the display of message or messages.

5.9. The average driver of motorized vehicle at high rate of speed can comprehend two message panels. Each panel should be complete phrase and each phrase should be independent of the other. The messages should consist of:

A problem statement	–	Road work/accident ahead
An effect statement	–	Delay/congestion
An attention statement for certain group	–	Motorist
An action statement	–	Take the next carriageway

5.10. Some typical messages are as given below:

- Accident ahead, Road Closed, Take Diversion;
- 'Accident Ahead', followed by some typical messages like 'Expect Delays', 'Merge Right', 'Merge Left', 'All Traffic Exit' can be displayed.
- Maximum Speed:_____ Kmph
- Speed Limit Strictly Enforced
- Construction Work, Road Closed;
- Signal Ahead;
- Sharp Curve Ahead;
- Congestion ahead;
- Bad weather conditions like 'Heave Fog Ahead', 'Poor Visibility Ahead';
- Trucks Use Left Lane;
- Watch for Stopped Traffic;
- Watch your speed;
- Watch for Falling Rocks: (In the case of landslide prone areas);
- Two way Traffic Ahead (This message can be displayed where the road section abruptly changes from Four/Six lane divided sections to two lane bi-directional carriageways).
- No Mobile When Mobile;
- Drunken Driving Prohibited.

6. **Planning for sign and marking systems:**

Following aspects are required to be kept in mind so as to provide proper system of signs and markings on National Highways in the country:

6.1. The traffic signs on National Highways and other roads must conform strictly to the configuration, colour scheme and location as prescribed in IRC:67-2001 which is also based on the UN Convention on Road Signs and Signals, Vienna November, 1968 of which India is one of the signatories.

6.2. All road markings shall conform strictly to the stipulations contained in IRC:35-1997 in terms of application, colour scheme and layout.

6.3. The traffic signs and markings shall be uniform throughout the country and no individual officer, in charge of any project/road section, shall change it or modify it without referring the matter to Director General (Road Development), Ministry of Shipping, Road Transport & Highways. In case, some of the sign requiremnets are neither covered in IRC:67-2001 and marking requirement in IRC:35-1997 nor in UN Convention on Road Signs and Signals at Vienna, the matter would be referred to the Ministry with suggestions and full justification and the new signs and markings shall be adopted only after due approval from the Ministry.

6.4. The traffic signs will have only legends and figures. If any message for a particular sign is to be emphasized through words, the same would be done by putting the emphasized message on a definition plate below the sign as prescribed in IRC:67.

6.5. Message such as "Drive Slowly" "Someone is wating for you at home" etc. are redundant since they cannot be ready while driving on a highway. Therefore, all such messages in words are not to be provided.

6.6.* Traffic signs and their supports shall not bear any advertising message that is not related to traffic control. The Ministry's circular No. RW/NH-33023/31/88-DO-III dated 22.3.1996, 19.3.1997 and 9.2.1998 relating to private participation in provision of traffic signs on National Highways is hereby withdrawn.

6.7. Uniformity of traffic signs and markings is vital for their effectiveness and for commanding respect retention. Change of signs in terms of their configuration, placement and colour scheme confuses the users and defeats the very purpose of signs.

6.8. The placement of signs should be such that no clustering takes place. In case the site conditions demands more than one sign to be provided at a particular location, then instead of putting one after the other, they should be palced on a single support one over the other or on an overhead cantilever support side by side. While doing so the order of prominence given would be regulator cautionary and informatory.

6.9. While deciding the exact placement of sign, care has to be taken that they are clearly visible to approaching driver and are not hidden behind a bush, branch of tree or any other object.

6.10. The selection of the retro reflective sheeting for signs shall be in accordance with Ministry's specifications with prescribed guarantee.

6.11. Support for the signs should be GI piples which would be safer compared to channel or angle iron supports with edges.

6.12. All traffic signs shall be on retro-reflective sheeting's and road markings with thermoplastic paint with glass beads.

6.13. The entire National Highway stretch shall be provided with an elaborate system of pavement marking. IRC:35 prescribes use of white colour for road markings. Yellow colour is allowed only for parking restrictions, obstruction approach markings, no overtaking zone markings.

6.14. All traffic signs and markings shall be properly maintained so that they are clearly visible at all time especially during night and in inclement weather. Damaged/defective/worn out signs and markings shall be replaced on immediate basis.

6.15. The provision of overhead signs especially on two lane and four lane roads should be carefully done keeping in view following conditions:

a) Traffic volume at or near capacity;

* Circulars of this Ministry mentioned in para 6.6 are not being withdrawn at present.

b) Complex interchange design;

c) Three or more lanes in each direction;

d) Restricted sight distance;

e) Closely spaced interchanges;

f) Multi-lane exists;

g) Large percentage of commercial vehicles;

h) High speed traffic;

i) Consistency of sign message location through a series of interchanges;

j) Insufficient space for ground mounted signs;

k) Background of street lighting;

l) Distances of important places enroute highways at suitable intervals.

6.16. Overhead signs shall be supported on cantilever and gantry structures which are designed to be aesthetically pleasing and sleek. Circular columns shall be perferred for vertical support. Safety barriers shall be provided at these supports for their protection as well as for safety of road users. The pedestal of support columns shall be flushed with the ground but in no case shall protrude for more than 15 cm from ground level.

6.17. While planning for VMS, the messages and their fomatting shall be standardized and approval sought from the Ministry, specially for National Highways. Any deviation should be referred to the Ministry and should be used only, if approved.

7. Implementation:

7.1. In order to ensure that road network is provided with proper, correct and uniform traffic signs and markings, the road authority would take following steps;

i) This circular would be sent to all field units for strict compliance;

ii) In the process of preparing a detailed project report for improvement of a stretch of road, the provisions of this circular would be complied with;

iii) The provision of signs and markings shall be reviewed for existing highways and the same shall be provided and/or corrected as per IRC:67 and IRC:35.

7.2. While preparing the detailed project report for improvement of a section of National Highway or any other road, separate detailed drawings shall be prepared showing the exact location and type of traffic signs and details of road markings to meet specific requirements at different locations of the road.

7.3. The officers in charge for the project at the level of Chief Engineer/CGM (in case of NHAI) shall ensure that the design team is fully aware of this circular and prepare the detailed plan for traffic sings and markings accordingly.

7.4. It shall be ensured by officers in charge at the level of Chief Engineers in the Ministry, in States, in BRO and in NHAI that all the traffic signs and markings conform to IRC:67 and 35 respectively. All non-conforming and defective signs and markings shall be removed and replaced immediately. The expenditure on the same can be made from Annual Plan.

7.5. For projects to be implemented from budgetary sources, the bill of quantity would include all such items for a detailed provision for traffic signs and markings. The BOQ would also include the signs and markings planned and to be provided in the construction zone (s) as per IRC:SP:55.

7.6. During the execution of the proposed improvement, it shall be ensured by the officer in charge at the level of Chief Engineer/CGM (in case of NHAI) that the detailed plan for traffic signs and markings has been executed at site with correct traffic signs in accordance with IRC:67 and Road Markings in accordance with IRC:35. Any sign or marking not found in accordance with these standards shall be immediately replaced at the risk and cost of the concered contractor/supplier.

7.7. For projects to be implemented under PPP, it would be ensured by Independent Engineer and Highway Authority that the Concessionaire complies with the relevant Schedule(s) and prepared a detailed plan for traffic signs and pavement markings for Project Highway.

7.8. In case of projects under PPP, the responsibility of providing detailed, correct and uniform system of signs and markings shall rest wih he Concessionaire. The Independent Engineer shall ensure this. Any default by the Concessionaire and failure to rectify within the prescribed time limit when pointed out by the Independent Engineer shall be considered as a breach, in accordance with the relevant provisions contained in the agreement.

7.9. In case, any non-compliance of this circular and/or any case of non-uniform and incorrect signs and markings provided by the field unit on any stretch or section of National Highway comes to notice, the same shall be reviewed by a Committee constituted by DG(RD) for the purpose of rectification and suitable penal action which could be through invoking the powers available under Central Road Fund Act.

Annex-I

Ministry's Circulars pertaining to Road Signs & Markings

S.No.	Circular No. & Date	Particulars
1.	PL-80(2)/71-SP dated 27.7.71	Increased Safety on NHs through Provision of Road Marking and Road Signs.
2.	NH-III/P/24/76 dated 2.4.76	Maintenance of Berms and Road Signs
3.	NH-III/P/24/76 dated 2.7.79	Indication of Names of Places and Kilometerage at Crossing on NHs in Hindi
4.	NH-III/P/24/76 dated 16.6.81	Script of Information KM Stones & Informatory Sign
5.	RW/NHVI-80(1)74 dated 28.7.81	Revision of Traffic Signs
6.	RW/NHVI-80(1)/74 dated 8.10.82	New Road Signs
7.	PL-30(45)/84 dated 20.10.84	Use of Reflective Sheeting for Road Signs
8.	RW/NHVI-80(1)/74 dated 29.10.84	Revision of Traffic Signs
9.	RW/NHVI-80(1)/74-Vol. II dated 30.11.84	Centralised Fabrication/Procurement of New Road Signs in the respective Public Works Department
10.	RW/NHVI-50(11)/84 dated 13.5.84	Use of SCOTCHLITE Reflective Sheeting for Traffic Signs

11.	RW/NHVI-50(8)/85 dated 13.5.85	Hot applied Thermoplastic Pavement marking Paint 'HATPROM'
12.	RW/NHVI-80(1)/74 dated 14.5.85	Revision of Traffic Signs
13.	NH-1107/1/87-DOI dated 8.9.88	Augmentation of Distance Informatory/Destination Signs on NHs under a time-bound programme
14.	NH-11047/1/87-DOI dated 21.12.88	Augmentation of Distance Informatory/Destination Signs on NHs under a time-bound programme
15.	NH-11047/1/87-DOI dated 7.7.89	Use of Language in Augmentation of Distance Informatory/Destination and Direction/Place Identifications Signs on NHs
16.	RW/NH-33022/3/89-DOII (A) dated 3.11.89	Massive Drive for Provision of Road Signs a Potentially Dangerous Locations
17.	RW/NH-34016/1/88-DOII dated 28.11.90	Road Marking Paints–Wearing Resistance thereof
18.	RW/NH-11047/1/87-NH-III/DOI(Pt) dated 14.2.92	Use of script on km stones on NHs and State Roads
19.	RW/NH-11047/1/87-DOI dated 11.3.93	Road Signs on NHs using retro-reflective sheeting
20.	RW/NH-33023/31/88-DO-III dated 2.5.94	Policy regarding installation of Road Signs using Retro-reflective sheeting on NHs
21.	RW/NH-11047/1/87-DOI Vol. II dated 27.6.94	Pavement markings–use of road marking machines
22.	RW/NH-33023/31/88-DO-III dated 4.12.95	Policy regarding installation of Road Signs using Retro-reflective Sheetings on NHs
23.	RW/NH-33023/31/88-DO-III dated 15.1.96	Use of Sheet Moulding Compound (SMC) Plates for Road Traffic Signs
24.	RW/NH-11047/1/87-DOI dated 8.2.96	Use of Sheet Moulding Compound (SMC) Plates for Road Traffic Signs
25.	RW/NH-33023/31/88-DO-III dated 5.2.96	Policy regarding installation of road signs using retro reflective sheetings on NHs.
26.	RW/NH-33023/31/88-DO-III dated 5/15.2.96	Installation of Road Signs using Retro-reflective Sheetings on NHs-NHs-Feedback regarding Field Performance
27.	RW/NH-33023/31/88-DO-III dated 22.3.96	Policy regarding Private Participation in provision of Retro-reflective road sings on NHs
28.	RW/NH-33023/31/88-DO-III dated 26.8.96/9.9.96	Road signs on NHs using Retro-reflective sheeting
29.	RW/NH-33023/31/88-DO-III dated 19.3.97	Policy regarding Private Participation in provision of retro-reflective road signs on NHs-Model draft agreement

30.	RW/NH-33023/10/97-DO-III dated 11.6.97	Tentative Specifications for Reflective Pavement Markers (Road Studs)
31.	RW/NH-33023/31/88-DO-III dated 9.2.98	Private participation in provision of retro-reflective road signs on NHs
32.	RW/NH-11047/1/87-DOI Vol. II dated 30.6.1999	Thermoplastic Road Marking Material
33.	RW/NH-33023/20/99-DO-III dated 27.4.2000	Road Signs on NHs using Retro-reflective sheeting-Forge Circular–Reg.
34.	RW/NH-33044/15/2000-S&R dated 3.8.2000	Road Signs on NHs using Retro-reflective sheeting-reg.

Annex-II

SPECIFICATIONS, GUIDELINES AND CODES OF PRACTICE FOR TRAFFIC SIGNS AND ROAD MARKINGS AND OTHER FEATURES OF ROAD SAFETY

S.No.	Code/Document No.	Title of Publication
		Traffic Signs
1.	MORT&H	Specifications for Road and Bridge Works (Fourth Edition)
2.	IRC:2-1968	Route Marker Signs for NHs (First Revision)
3.	IRC:8-1980	Type Designs for Highway Kilometre Stones (Second Revision)
4.	IRC:31-1969	Route Marker Signs for State Routes
5.	IRC:67-2001	Code of Practice for Road Signs (First Revision)
6.	IRC:79-1981	Recommended Practice for Road Delineators
7.	IRC:30-1968	Standard Letters and Numbers of Different Heights for Use on Highway Signs
		Road Markings
1.	MORT&H	Specifications for Road and Bridge Works (Fourth Edition)
2.	IRC:35-1997	Code of Practice for Road Markings (with Paints) (First Revision)
		Road Safety & Traffic Management
1.	IRC:93-1985	Guidelines of Design and Installation of Road Traffic Signals
2.	IRC:79-1981	Recommended Practice for Road Delineators
3.	IRC:SP:27-1984	Report Containing Recommendations of IRC Regional Workshops on Highway Safety
6.	IRC:SP:55-2001	Guidelines for Safety in Construction Zones
7.	MORT&H	Mannual for Safety in Road Design