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File No.RW/NH-33044/18/2020-S&R (P&B)
Government of India
Ministry of Road Transport & Highways
(S&R Zone)
No.1, Parliament Street, Transport Bhavan, New Delhi-110001

Dated: 14th December, 2020

To,

1. The Chief Secretaries of all State Governments/UTs.

2. The Principal Secretaries/ Secretaries of all States/ UTs PWD dealing with National Highways, other centrally sponsored schemes and state schemes.

3. All Engineer-in-Chief and Chief Engineers of all States/ UTs PWD dealing with National Highways, other centrally sponsored schemes and state schemes.

4. The Chairman, National Highways Authority of India (NHAI), G-5&6, Sector-10, Dwarka, New Delhi-110075.

5. The Managing Director, National Highway Infrastructure Development Corporation Ltd., 3rd floor, PTI Building, Parliament Street, New Delhi-110001.

6. Director General (Border Roads), SeemaSadakBhawan, Ring Road, New Delhi -110010.

7. All CE-ROs, ROs and ELOs of the Ministry

Subject: Use of New/alternative Material and Technology in construction of Highways

Madam/Sir,

It is felt necessary to consolidate various instructions of MoRTH, codal provisions and guidelines regarding cost effective new/alternative Material and Technology in highway construction to reduce construction cost.

2. IRC guidelines are available for use of Cement Treated Base (CTB), Cement Treated Sub-base (CTSB), Waste Plastic, Geo-Synthetics, Recycling,Fly-ash, modified Bitumen (CRMB, Polymer modified, Natural Rubber), Soil stabilization, etc. in highway construction. It is necessary to promote these materials/technologies in construction and maintenance of National Highways for harnessing potential time and cost savings.

3. The details of these material/technology and relevant IRC Guidelines/MoRT&H circulars are summarized at Annexure-I:

4. IRC has also accredited new materials/techniques/equipment/products. These may also be used as per the above Code/Guidelines/Circulars. The details of accredited material/technology are available on IRC website.

5. The standard EPC document issued by Ministry on 05.03.2019 specify Defects

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Liability Period ranging from 3 to 10 years for development and maintenance work, depending on the type of pavement, standalone bridge/tunnel, new/alternate material/technology used etc. Ministry's circular No. RW/NH-33044/10/2002/S&R (P&B) dated 21.08.2018 had also specified Defects Liability Period of 10 years for the stretches where new technology/material has been used/ is proposed to be used.

6. As per Article 10.2 of the model document for EPC contract agreement, it is the responsibility of Authority's Engineer to review and approve the design and drawing prepared and submitted by contractor.

7. All ROs of Ministry/NHAI/NHIDCL & CEs of BRO are requested to use (i) new/ alternative Material and Technology and (ii) locally available materials which are suitable and cheaply available in the area in Highway construction for better quality of construction, sustainability and cost and time savings.

8. DPR consultant shall furnish life cycle project cost comparison amongst the options using conventional material/ technologies & with the use of new/alternative Material and Technology based on rate analysis as per Standard Data Book of the Ministry/ market rate. DPR approving authority should ensure that such comparison has been done by the DPR Consultant and the new/alternative Material and Technology proposed by the DPR consultant is cost effective as well as environment friendly.

8.1 Bidding of the project will be taken up considering the cost determined by DPR consultant based on conventional material/ technologies or new/alternative Material and Technology which is most economical to the Authority. It will not bar the contractor/concessionaire to use other new/alternate material/technology. The decision of use of appropriate material/technology will rest with the contractor/concessionaire subject to satisfactory compliance to the provisions of this circular.

8.2 In case use of such new/alternate material/technology by the contractor/concessionaire brings down the cost of construction/maintenance, provided it meets all other design/construction provisions as envisaged in the contract and stipulated in the Codes, Standards, Specifications, Guidelines etc. specified under schedule D, the Authority shall not revise the contract price nor ask the contractor to transfer the cost reduction benefit to the Authority.

8.3 **It is clarified that any new alternate, material & technology that has been accredited by IRC, and falling under IRC:SP-89 (Part II), will not require further accredition, and will henceforth fall under approved, alternate, material and technologies. For such approved, alternate, material and technologies, the Defect Liability Period shall be at par with conventional /flexible pavement.**

9. "It is clarified that the material/ technology for which Codes, Standards, Specifications, Guidelines etc. of IRC, MoRTH, AASHTO, ASTM, Euro Code and British Codes are available shall not be treated as new/ alternate material/technology and, as such, Defects Liability Period (DLP) of projects using such material/technology shall not fall into the category corresponding to new material/technology. **Hence the defect liability period will be at par with conventional/flexible pavement.** The stretches where new material/ technology is used for which Codes, Standards, Specifications, Guidelines etc. of IRC, MoRTH,

AASHTO, ASTM, Euro Code and British Codes, FHWA guidelines are not available, the project may be taken up on pilot basis and the Defects Liability Period of such projects shall be 10 years."

10. No separate approval from the Authority is required for using new/ alternate Material/ technology within the contract provisions. The Authority's Engineer/ Independent Engineer shall also approve the design and drawing of all the new/ alternate Materials proposed by contractor/ concessionaire for which international standards such as AASHTO, ASTM, Euro Code and British Codes, FHWA guidelines are available.

11. If the use of alternative material/technology is not specifically covered in the Indian or International Standards as mentioned para 9 above, contractor/ concessionaire would be permitted its use on certification by owners of similar projects regarding the continued successful performance of such materials, technologies, methods, procedures or processes for design life of the project as per Para 1.9 of Manual of two laning/ four laning/ six laning of IRC. In this regard, it is hereby clarified that usage in Indian condition shall not be insisted by the Authority's Engineer/ Independent Engineer for the Material/ Technology if certification by owners of similar projects regarding the continued successful performance of such materials are confirmed. **The contractor/concessionaire will however be required to submit all quality assurance and quality control documents and demonstrate to the satisfaction of** Authority's Engineer/ Independent Engineer satisfactory performance of the pavement or structure using such material or technology. Authority may seek performance of the use of such material and technology through appropriate diplomatic channels. However, Defects Liability Period of such projects **shall be 3 to 10 years(Varying subject to specific technologies)** and approval shall be accorded at the level of Regional Officers or equivalent officers on recommendation of Authority's Engineer/ Independent Engineer.

12. IRC:SP:112-2017 "Manual for Quality Control in Road and Bridge works" and various IRC Codes/MoRTH guidelines prescribe specifications and standards for design and construction of various proprietary items such as Geosynthetics. Contractor/concessionaire will ensure that the design parameters, warranty and other requirements are fulfilled by manufacturer(s) of such proprietary items as specified in applicable standards/guidelines. In addition, the contractor/ concessionaire has to comply the documentation requirements from manufacturer/ self, test on proprietary items as specified in IRC:SP:112-2017 "Manual for Quality Control in Road and Bridge works" and applicable standards/guidelines.

13. **ROs/EDs** of Ministry/NHAI/NHIDCL & CEs of BRO (Kerala, Karnataka, Tamil Nadu, Puducherry, Andhra Pradesh) shall implement projects involving coir technology and ROs of Ministry/NHAI/NHIDCL & CEs of BRO (West Bengal, Odisha) shall invariably consider using jute technology wherever appropriate.**A monthly report shall be submitted by all this ROs/EDs.**

14. All ROs of Ministry/NHAI/NHIDCL & CEs of BRO are requested to submit quarterly reports indicating the number of projects and quantity of New/Alternative material used by them to the Ministry.

15. The contents of this circular may be brought to notice of all.

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Yours faithfully,

(Jagat Narayan)
Superintending Engineer (S&R Zone)
For Director General (RD) & SS

Copy to:

1. All ROs/ ELOs of MoRTH and all Technical Officers at MoRTH Headquarter.
2. Secretary General, Indian Roads Congress
3. Director, IAHE, NOIDA
4. PPS to Secretary (RTH), PPS to DG (RD) &SS, PS to AS&FA, PS to ADG- III
5. NIC-with request to upload on the Ministry's portal.

Annexure-I

S No.	Material/ Technology	Applications	IRC Code/Guidelines/ IS Code	MoRT&H Circular
1.	Waste Plastic	Wearing Coat	**IRC:SP-98** "Guidelines for the use of Waste Plastic in Hot Bituminous Mixes (Dry Process) in Wearing Courses".	i. Circular No RW/NH-33044/24/2015-S&R (R) dated **26.11.2019** "Use of Waste Plastic in hot bituminous mixes in wearing courses (dry process) for construction of National Highways"; ii. Circular No. RW/NH-33044/24/2015-S&R (R)dated **27.08.2019** "Collection and Re-use of Waste

				Plastics: Swachhata hi Seva Campaign"; iii. Circular No. RW-NH-33044/24/2015-S&R (R)dated **27.12.2016** and **09.11.2015** "Use of Plastic Waste in bituminous mixes in construction of National Highways".
2.	Cement Treated Granular Layer	In Base (CTB); In Sub-base (CTSB)	**IRC:37** "Guidelines for the Design of Flexible Pavements".	-
3.	Geo-Synthetics	i. Reinforcement in pavement ii. Slope-Protection iii. Separation, Filtration, Drainage and erosion control iv. Impermeable barrier/capillary cut off in waterlogged areas v. Stress relieving membranes and crack retarding layer.	i. **IRC:SP:59** Guidelines for Use of Geo-synthetics in Road Pavements and Associated Works"; ii. **IRC:113** "Guidelines for the Design and Construction of Geo-synthetic Reinforced Embankments on Soft Sub-soils". iii. **IRC:SP:48** "Hill Road Manual" iv. **IRC:56** "Recommend	Circular No. 33044/64/2018-S&R (P&B)dated **16.07.2018** "Geo-Synthetics and their use in road construction".

			ed Practices for Treatment of Embankment and Roadside Slopes for Erosion control" v. **IRC:SP:106** "Engineering Guidelines on Landslide Mitigation for Indian Roads"	
4.	Recycling	i. Wearing Coat ii. Crust building	**IRC:120** "Recommended Practice for Recycling of Bituminous Pavements".	i. Circular No. RW/NH-33044/10/2002/S&R (R) dated **11.01.2018** "Guidelines for implementation of Hot in place Recycling technology for Periodic Renewal (PR) works"; ii. Circular No. RW-22012/01/2012-Mechdated **18.12.2012** "Use of Recycling technology for PR (Periodic Renewal) works on National Highways".
5.	Fly-ash	i. Embankment ii. Cement Concrete iii. Stabilization	i. **IRC:SP:58** "Guidelines for Use of Fly Ash in Road Embankments "; ii. **IRC:SP:106** "Engineering Guidelines on Landslide Mitigation for Indian Roads"	i. Circular No. RW/NH-33044/01/2019-S&R (P&B)dated **23.10.2020**

			ii. **IRC:44** "Guidelines for Cement Concrete Mix Design for Pavements"; iii. **IRC:SP:89** "Guidelines for Soil and Granular Material Stabilization Using Cement, Lime and Fly Ash".	"Use of Fly-ash in road/flyover embankment construction on NH works"; ii. Circular No. RW/NH-35014/20/2017-H dated **07.01.2019** "MoU for off-take of Fly-ash from private power stations"; iii. Circular No. 24028/14/2018-H dated **27.08.2018**"Use of Fly-ash in road/flyover embankments construction".
6.	modified Bitumen (CRMB, Polymer modified, Natural Rubber)	Wearing Coat	i. **IRC:SP:53** "Guidelines on Use of Modified Bitumen in Road Construction"; ii. **IRC:SP:107** "Guidelines for Gap Graded Wearing Course with Rubberised Bitumen-(Bitumen Rubber)".	i. Circular No. RW/NH-35072/05/2018-S&R (P&B) dated **24.08.2018**"Use of Bitumen & Modified Bitumen in the construction of flexible pavements and their source of their procurement for National Highways Work"; ii. Circular No. RW/NH-33044/05/2016/S&R (R)dated **05.09.2016** and

				28.03.2016 "Use of polymer/rubber modified bitumen on NHs and other centrally sponsored schemes"; iii. Circular No. RW/NH-33044/49/2015/S&R (R)dated **18.02.2016** "Use of polymer/rubber modified bitumen on NHs and other centrally sponsored schemes"; iv. Circular No. RW/NH-33041/3/2001-S&R(R)dated **30.01.2012** "Use of bitumen/ modified bitumen for National Highway Works"; v. Circular No. 33041/3/2001-S&R (R)dated **19.07.2011** "Use of Modified Bitumen in BM/DBM layers for National Highway Works".
7.	Soil stabilization	Chemical Stabilization	**IRC:SP-89 (Part II)** "Guidelines for the Design of Stabilized	-

			Pavements (Part-II)".	
8.	Jute	Slope Stabilization	**IRC: 56** "Recommended Practices for Treatment of Embankment and Roadside Slopes for Erosion Control"	-
9.	Coir	Slope Stabilization	**IRC: 56** "Recommended Practices for Treatment of Embankment and Roadside Slopes for Erosion Control"	-
10.	Construction & Demolition Waste	i. Embankment ii. Granular Layer in flexible pavement iii. Concrete Pavement	**IRC:121** "Guidelines for Use of Construction and Demolition Waste in Road Sector"	-
11.	Recycled Aggregate/Slag Aggregate/Bottom Fly Ash	i. Concrete ii. Granular Layer	**IS:383** "Coarse and Fine Aggregate for Concrete - Specifications"	Circular No.RW/NH-34066/09/2017-S&R(B) dated **21.07.2020** "Use of Manufactured Aggregates in National Highway Works".
12.	Stone Matrix Asphalt	Wearing Coat	**IRC:SP:79** "Tentative Specifications for Stone Matrix Asphalt"	Circular No. RW/NH-35072/05/2018-S&R(P&B) dated 24.08.2018 on "Use of Bitumen & Modified bitumen in the construction of flexible pavements and source of their procurement for National Highways works"
13.	Fibre reinforced concrete pavement	Road crust	**IRC:SP:46** "Guidelines for Design and Construction of Fibre Reinforced Concrete	-

			Pavements"	
14.	Cold Mix Technologies	Wearing Coat	**IRC:SP-100** " Use of Cold Mix Technology in Construction and Maintenance of Roads Using Bitumen Emulsion"	-
15.	Open Graded Friction Courses	Wearing Coat for high rainfall areas	**IRC-129** "Specifications for Open-Graded Friction Course"	-
16.	Thin White Topping	Wearing Coat	**IRC:SP:76** "Guidelines for Conventional and Thin White-topping"	-
17.	Precast Pre-tensioned girders for bridges, Integral Bridges	Bridges	**IRC:SP:71** "Guidelines for Design and Construction of Precast Pre-tensioned Girders for Bridges"	

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