

Decision of Ministry of Environment, Forest and Climate Change with respect to discussion on issues pertaining to clarifications sought on Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016, as approved by the Competent Authority on the basis of recommendation of the 94th Meeting of the Technical Review Committee (TRC) held on 14th July, 2025.

PROCEEDINGS

94th Meeting of the Technical Review Committee (TRC) for discussion on issues pertaining to clarifications sought on Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, held on 14th July, 2025 through Online mode under the chairmanship of Shri Sudhir Srivastava.

Opening Remarks of the Chairman: The Chairman extended welcome to members and other participants and requested to start the proceeding as per the agenda adopted for this meeting.

Consideration of Proposals: The TRC considered the proposals as per agenda adopted for the meeting. The details of deliberations held and decisions taken in the meeting are as under:

Agenda.1. Crumb rubber modifier (CRM) to be blended in bitumen for use in road construction in view of the recommendation given in circular Economy Report on ‘Tyre and Rubber Recycling Industry’ and subsequent Circular Economy Action Plan Finalized by NITI Aayog.

Circular Economy Report on ‘Tyre and Rubber Recycling’ submitted to NITI Aayog by MoEFCC inter-alia recommends use of Crumb Rubber Modified Bitumen (CRMB) in road construction.

2. A representation was received from Material Recycling Association of India (MRAI) for promoting use of CRMB recovered from waste tyres for building Green Roads. Ministry after discussing the matter in Technical Review Committee (TRC) constituted in the Ministry, had issued an Advisory on 07.06.2023 to Chief Secretaries of All States/UTs and Secretary, Ministry of Road, Transport and Highways (MoRTH) that CRMB may be used in road construction by all the agencies wherever it is feasible, practicable, meet the quality standards and also keeping in view the cost effectiveness of the material and also to achieve the goal of Circular Economy.
3. MoRTH was also requested *vide* OM dated 07.06.2023 to further examine the practical issues in consultation with all stakeholders and identify and initiate steps for a wider use of CRMB.
4. The issue of mixing of certain percentage of Crumb Rubber Modifier (CRM) with bitumen to promote CRMB in road construction was raised at several forum. Therefore, Ministry referred the matter to TRC for discussion and recommendation as appropriate for mandating blending of certain percentage of Crumb Rubber Modifier in bitumen. Subsequently, a reference received from Secretary, Ministry of Road, Transport and Highways (MoRTH) *vide* DO letter dated 17th February 2025 inter-alia suggested that a certain percentage of crumb rubber modifier (CRM) should be mixed with bitumen for sale. The suggested mandates would ensure a consistent supply of CRMB and meet the demands of road construction. The same was also referred to TRC.
5. TRC discussed the matter in its meeting held on 28.01.2025 and 28.02.2025. Representatives of MoRTH, NHAI, BPCL, IRC also attended the meeting.

- During the meeting, TRC noted that Crumb Rubber Modifier (CRM) is blend of waste tyre Rubber Powder, Hydrocarbons and Cross linkers. The Rubber gives the additional bindings strength & increased elasticity. Hydrocarbon & Cross linkers dissolves into the bitumen & helps in improving the softening values & water repellent properties.
- It was informed by BPCL that CRM can be prepared by grinding it in cryogenic conditions to a size of less than 600 microns. The process is a physical dispersion of crumb rubber into bitumen and grades like CRMB 55 & 60 are good as per BIS No.17079, 2019 where the specifications of the product are already laid. Further, it was also highlighted that after preparation, the material should be placed at site within 6-8 hours due to stability issues though tankers are available which are providing optimum heat required during transportation. It is a cost effective practice but the geographical conditions viz. temperature, traffic loading etc. are a matter of concerns as per MoRTH.
- It was also seen that not only cryogenic process, which is widely used but also shredded product can also be used ranging up to 300 microns (around 30-40 mesh) particle size. As per, ASTM D8 worldwide standard, the recommended minimum rubber content for asphalt rubber is 15% by weight of the asphalt cement. The benefit of using this standard is 30 to 40 years of extended life with low maintenance.
- During the meeting representative of MoRTH informed that the Ministry had already issued a circular on 23 August 2023 and para 2.1 of this circular dealt with the selection of appropriate grade of bituminous binder.
 - Para 2.2 of the circular deals with the specifications for the bituminous binder; more specifically, para 2.2.3 specifies that Rubber Modified bitumen shall comply with the requirements mentioned in IRC: SP:53.
 - Para 2.3 of the above circular deals with the source of procurement of bituminous binder.
 - Para 2.3.2 specifies that modified bitumen shall be procured from domestic sources only. It also states that ‘as all refineries do not produce modified bitumen themselves, modified bitumen may be procured from domestic refineries or private producers.’
 - Para 2.4 of the circular deals with quality control of bituminous binder. Annexure 4 deals specifically with Rubber Modified Bitumen and clearly lays down that ‘No project site blending/production of modified bitumen shall be allowed’.
- Representative of MoRTH further informed that as recommended by TRC in its 78th meeting held on 17th May, 2023 regarding use of CRMB in road construction to help in achieving the goal of Circular Economy, MoEFCC had issued an advisory to use CRMB in all types of roads wherever it is feasible, practicable and quality is assured. Further, MoRTH was also requested to further examine the practical issues in consultation with all stakeholders and identify and initiate steps for a wider use of CRMB.
- Representative from MoRTH informed that after receipt of advisory from MoEFCC, MoRTH had constituted a bitumen Task Force comprised of subject domain experts, researchers, academicians, manufacturers and representative/s of IRC. The Task Force noted that IRC:37, which deals with the selection of bituminous binder, considers only the traffic volume, but not the temperature,

rainfall etc. Based on the observations and recommendations of Task Force, MoRTH has issued a circular on 19th April, 2024 regarding recommended bitumen type & grade for different climate and traffic loading for National Highway and Expressway works in India.

- The circular dated 19th April 2024 superseded the provisions contained in Para 2.1 of the Circular dated 23 August 2023. The type and grade of bitumen to be used for different traffic loading and climatic conditions is given in Annexure-1 of this circular and is to be effective in all bids received 60 days after the issue of the circular.
 - He further informed that as per IRC:37, CRMB is to be used in bituminous concrete, where design traffic is more than 50 million standard axles (msa); however, based on the recommendation of Task Force, CRMB can be used in bituminous concrete where design traffic is 20-50 msa.
 - TRC noted that the circular gives an option between CRMB 60 and PMB of different grades, as far as bituminous concrete is concerned. The TRC noted that use of crumb rubber modifier in bitumen results in reduction of the quantity of bitumen needed whereas PMB requires the use of imported polymer. PMB is also costlier. However, representative of MoRTH felt that this choice should be left to the market forces.
 - During the meeting representative of NHAI informed that in India, around 3 Lac MT/ annum of CRMB (mostly grade 55 & 60) are used as per IRC 107 specification i.e. for Bitumen Concrete (BC) and are being projected for more use. It was also informed that MoRTH has already issued guidelines regarding the usage of CRMB, PMB etc. for construction of roads in August, 2023 in consultation to the CRRI and other stakeholders.
 - After detailed deliberation, the committee felt that more discussion is required on the matter and stakeholders especially from the refineries and recyclers associations, like IOCL, CRRI, Ministry of Petroleum and Natural Gas etc may be called in the next meeting. Further, more details viz. ground reality, logistics issues and any other constraints may also be obtained from MoRTH for further discussion in the next meeting of TRC.
6. The matter again discussed in TRC meeting held on 27th March, 2025.
- During the meeting, representative from BPCL informed that the online portals are taking it from private players and then only they are selling in a small quantity to the people. Further, representative from IOCL also informed that there is no market or demand of CRMB as they are underutilized and the sales is less than the production capacity. Further, representative of IOCL and BPCL also informed that the availability CRMB is not an issue.
 - After the deliberation TRC still felt that more discussion is required on the matter and asked from representative of MoRTH to create a proforma detailing the potential demand for CRMB, how much and where it is being used and coordinate with NHAI to share the actual data of consumption of CRMB and PMB during construction of roads with some documentary support. Committee also requested MoRTH to share experience with respect to non-refinery sources of CRMB and PMB.
7. Subsequent to the meeting, MoRTH has provided only the actual data of consumption of CRMB and PMB during construction of roads in NHAI for last three financial year as under:

FY 2024-25 (in MT)		FY 2023-24 (in MT)		FY 2022-23 (in MT)	
CRMB	PMB	CRMB	PMB	CRMB	PMB
2,77,192.64	2,04,046.32	1,68,531.06	94,735.09	1,13,714.00	50,627.11

8. The matter again discussed in 94th meeting of TRC held on 14th July, 2025.

Deliberation:

- The committee notes that the MoRTH representative is also very keen with making use of CRMB mandatory in road construction and fully support the proposal to mandate mixing of CRM with bitumen at refinery level subject to the condition that product must align with BIS specifications.
- The representatives from BPCL informed that BPCL, IOCL, HPCL and MRPL are the manufacturers who are currently manufacturing Bitumen in India and the total manufacturing is roughly around 5.5 million MT per annum. Further, as of now, BPCL is not having their own CRMB production and producing VG grade Bitumen only. Further, they also informed that IOCL is producing major part of Bitumen & CRMB currently in the country. Further, BPCL also argued on the opinion of the MoRTH for mixing crumb rubber in the entire production of bitumen further argued that PMB is superior in performance although the cost implications are also there, but if we talk about the performance on the field, PMB is more preferred product than CRMB. The representative from CRRI also objected & highlighted about the quality control aspects such as, high shear mixing, strict temperature control in manufacture, agitation and temperature control during transport, utilization within 6-8 hrs of the production.
- TRC noted that the use of various grades of bitumen in road construction is governed by MoRTH's circular dated 19th April 2024, which has been issued on the basis of a detailed report submitted by a committee chaired by ADG, MoRTH, and comprising of representatives of all stakeholders including CRRI. This circular provides for an option of the use of certain grades of CRMB and PMB under certain specified climatic and traffic loading conditions.
- Committee finds that the use of both CRMB and PMB has increased over the past few years. Committee further noted that both CRMB and PMB, while significantly costlier than plain VG/PG bitumen significantly improve the road resistance to fatigue, rutting, cracking and water resistance. While CRMB is cheaper than PMB, and has sustainability benefits, as mentioned by the CRRI representative, PMB may performs better in certain climatic conditions. CRMB also requires proper grade of crumb, high shear mixing, proper maturation and stricter control over temperature and agitation during transit to ensure no separation and maintain quality parameters. Despite efforts by the committee, the reasons for contractor/ engineer preference for one over the other have not become clear. The committee also noted that the supply of domestic waste tyre is inadequate to meet the demand of rubber crumb, resulting in substantial import of waste tyre and the representation of MoRTH may resulting further additional import of waste tyres.

Recommendation: The committee has carefully considered this subject. The committee feels that the recommendations of MoRTH for mandatory mixing of certain percentage of Crumb Rubber

Modifier (CRM) with bitumen has to be considered from all aspects including the environment and sustainability perspective. In view of the strong recommendations of the MoRTH, the committee recommends that the producers of bitumen may be given minimum annual CRM utilization mandate of 3-5% of their total annual bitumen production in a phased manner starting from FY 2026-27 at the refinery level for production of crumb rubber modified bitumen (CRMB) as per BIS standards i.e. for FY 2026-27 – 3%, for FY 2027-28 – 4% and for FY 2028-29 and onwards – 5%. However, before making such statutory provisions, MoRTH and MoPNG may be consulted by the Ministry.

Agenda.2. Amendment to Hazardous and other Waste (Management and Transboundary Movement) Rules, 2016 by Department of Chemicals and Petrochemicals (DCPC), Ministry of Chemicals and Fertilizers.

Department of Chemicals and Petrochemicals (DCPC) *vide* D.O. letter dated 27th January, 2025 and 03rd April, 2025 has inter-alia requested deletion of entry pertaining to Brine Sludge listed at S.No.16.3 of Schedule I (List of Processes generating hazardous wastes) under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. It is mentioned that this issue has been examined at their end through multiple stakeholder discussions.

2. It is further mentioned that the production of caustic soda and chlorine is listed in Schedule I of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (at S. No. 16) as excerpted below:

S. No.	Processes	Hazardous Waste
(1)	(2)	(3)
16.	Production of caustic soda and chlorine	16.1 Mercury bearing sludge generated from mercury cell process 16.2 Residue or sludges and filter cakes 16.3 Brine sludge

3. The industry has pointed out that the use of mercury has been phased out in the production of caustic soda and that it has adopted the eco-friendly membrane cell technology. The Alkali Manufacturers' Association (AMAI) had requested exclusion of brine sludge (entry no. 16.3 above) generated from membrane cell caustic soda plants from Schedule I of the said rules. In response, Ministry of Environment, Forest and Climate Change had issued O.M. dated 23-206/2014-HSMD dated 2nd May, 2016 stating that “non-mercury bearing sludge from membrane cell caustic soda plants are non-hazardous.

However, due to lack of corresponding amendment in the rules, SPCBs have not recognized the validity of the above-mentioned OM resulting in confusion and inconsistent enforcement across states.

DCPC inputs:

The representative from DCPC suggested that the request of the industry merits consideration. Further, it is apparent that the entry at Sl. No. 16.1 takes care of any sludge, which is generated from chlor-alkali industry, which bears mercury. Such a sludge is clearly deemed as hazardous, as it is covered under the definition of Hazardous waste and requisite compliance is required to be done.

The industry has mentioned that the sludge, which is now being generated from the chlor-alkali industry, is from a process, which no longer uses mercury in terms of Minamata

Convention to which India is a signatory. Therefore, it is a non-mercury bearing sludge. Hence, it should not be treated as a hazardous waste on account of entry at Sr. No. 16.3 as above, which specifies 'Brine Sludge' as a hazardous waste. Hence, it is felt that deletion of the entry at S. No. 16.3 could be considered while retaining the entry at S. No. 16.1.

Deliberation: The representative from DCPC highlighted the issues raised by the industries that SPCBs are not following the O.M. dated 2nd May, 2016 regarding non-mercury bearing sludge from membrane cell caustic soda plants are non-hazardous, and are considering it as hazardous although the industries has phased out the use of mercury in its production process and adopted membrane cell technology. Due to the lack of corresponding amendment in HoWM Rules, 2016, this O.M. is not being validated at SPCBs' end. The committee enquired from CPCB about the SOP issued in 2021 on utilization of Brine sludge from chlor-alkali process that already is based on the hazardous nature of the Brine Sludge. CPCB informed that the SOPs are issued on the basis of trials conducted by an industry and on recommendation of the concerned SPCB, and a separate characterization exercise may not have been done at that time.

Committee was apprised that a meeting was held in the Ministry on 30th May 2025, under the co-chairpersonship of the Secretary, Department of Chemicals and Petrochemicals (DCPC) and the Secretary, MoEF&CC. Concerned officers of MoEF&CC, DCPC and CPCB were present in the meeting. In the meeting, the instant issue inter-alia was also discussed and it was decided that the matter would be referred to TRC for deliberations and suitable recommendations regarding deletion of entry at 16.3 of Schedule I from the HOWM Rules, 2016.

Recommendation: The committee asked DCPC to provide latest characterization details of Brine Sludge from the industry's stakeholders. The committee also recommended that samples may be collected/drawn by CPCB from a suitable number of industries generating brine sludge and analyzed for parameters given in Schedule II of HOWM Rules, 2016. On receipt of the analysis result from CPCB, and requisite information from DCPC the matter will be reconsidered for further deliberation/discussion.

Agenda.3. Request for withdrawal of distance criteria for setting up of Treatment, Storage and Disposal Facility - Representation from Jigani Industries Association, Bengaluru and Kanara Chamber of Commerce & Industry (KCCI), Mangaluru.

Jigani Industries Association, Bengaluru and Kanara Chamber of Commerce & Industry (KCCI), Mangaluru *vide* their letters dated 21.04.2025 and 22.04.2025 respectively have requested for withdrawal of distance criteria for setting up of Treatment, Storage, and Disposal Facility for hazardous waste. It is mentioned that Micro, Small and Medium Enterprises (MSMEs) are facing significant financial and logistical challenges due to the limited number and remote location of Treatment, Storage, and Disposal Facilities (TSDFs) leading to high operational costs, greater environmental risks, and compliance difficulties.

2. It is further mentioned that as per the Annual Inventory of Hazardous and Other Wastes Management (2022-23) submitted by KSPCB to CPCB, Karnataka generated 97,113.85 MT of hazardous waste. Out of 97,113.85 MT of hazardous waste generated annually in Karnataka, approx. 53,204 MT (over 54%) is generated in central and

coastal districts of Karnataka alone which underlines the urgent need for more accessibility.

3. The Ministry O.M. dated 20.06.2013 and 29.08.2016 mandates a minimum distance of 400 km between new and existing common TSDFs for hazardous wastes. This restriction has prevented the establishment of additional TSDFs particularly in industrially underserved regions and further restricted the development of essential infrastructure and created a compliance and cost burden for industries across Karnataka. Many states like Gujarat, Maharashtra, U.P. W.B. and Rajasthan, multiple TSDFs operate within 400 km of each other, enabling better waste management without compromising environmental safety.

4. In light of above, it is requested to withdraw or revise O.M. dated 20.06.2013 and 29.08.2016 and approve or allow for the establishment of new TSDF facility in Central Karnataka to cater to Coastal and Central districts.

Deliberation: The committee heard the views of the applicants and the applicants showed their concerns on mandates of O.M. dated 20.06.2013 and 29.08.2016 regarding minimum distance of 400 km between new and existing common TSDFs for hazardous wastes. They informed that currently almost 1,00,000 MT waste is generated in Karnataka. There were only two TSDF facilities existed in Karnataka but recently those two facilities are merged in a single entity. Thus, not only is the industry facing higher transportation cost, but due to the de facto monopoly, the treatment charges have also gone up, leading to suffering of small-scale industries. The monopoly of TSDF located in distant places may lead to non-compliance or unsafe on-site storage, risking environmental damage and public health. CPCB also informed about their guidelines regarding setting up of TSDFs where the minimum distance is around 250 km and further informed that probably, to keep check on mushrooming of TSDFs and keeping in mind the environmental concerns, the Ministry issued the said OMs in 2013 and 2016 which mandates a minimum distance of 400 km between new and existing common TSDFs for hazardous wastes. The committee was also apprised of the Maharashtra experience, where TSDFs were set up based on generation and capacity, subsidies in the form of concessional land pricing and financial support were given and there is some mechanism to regulate charges. The Committee also felt that the existing OMs were issued in 2013 and 2016, so it is high time to gather the state wise factual data on existing scenario.

Recommendation: The committee recommends CPCB to consult with all SPCBs and ask them to make assessment of the residual capacities of the current TSDFs, give their views on adequacy of TSDF facilities and appropriateness of their charges, future projection of generation of hazardous wastes and need for new TSDF facilities and other details. The committee also recommended prioritizing states like Karnataka and Haryana from where specific representations have come. In view of the aforesaid, the Committee felt that the matter may be taken after the receipt of requisite inputs/ information.

AGENDA ITEM No. 4: ANY OTHER ITEMS WITH PERMISSION OF THE CHAIR
