

PARLIAMENT QUESTION: Technological Contributions of CSIR–CRRI and Traffic Management Studies for Rajkot

Posted On: 18 MAR 2026 3:49PM by PIB Delhi

CSIR–Central Road Research Institute has developed and implemented several technologies and solutions in the road and transport sector during the last three years. These include: Steel Slag Road Technology for sustainable road construction using steel industry by-products; ECOFIX, a ready-to-use pothole repair material for rapid maintenance; Modified Mix Seal Surfacing (MSS+) for sustainable road construction; PATCHFILL, a mechanized pothole repair machine for efficient pothole repairs; Mobile Cold Mixer-cum-Paver (MCMP) for on-site preparation and laying of cold bituminous mixes; REJUBIT and REJUPAVE for rejuvenation and recycling of aged bituminous pavements; Plastic Waste-based Geocell Technology for strengthening pavement layers; and frequency-based noise barrier technology for mitigation of traffic noise in urban corridors. In addition, CSIR-CRRI has been undertaking comprehensive mobility plans, traffic and transportation studies, road safety audits and intelligent transport solutions such as iRASTE for improving traffic management and road safety. Some of these technologies have been transferred to industries for commercialization, while their field-level implementation has been facilitated in collaboration with agencies such as the National Highways Authority of India (NHAI), Border Roads Organisation (BRO) and various State Public Works Departments (PWDs). The brief details of the aforesaid technologies are at **Annexure – I**.

Although CSIR-CRRI has not conducted comprehensive traffic and mobility studies for Rajkot and its surrounding areas, the institute recently completed a sponsored project focusing on noise pollution in the city. The project was funded by the Gujarat Pollution Control Board (GPCB) and launched in September 2022. The study titled "Noise Mapping, Identification of Hotspots Violating Prescribed Norms and Mitigation Plan for Ensuring Compliance with Noise Pollution Rules, 2000" covered four major cities, namely, Ahmedabad, Surat, Vadodara and Rajkot. The final report has been submitted to GPCB.

The Government continues to support and strengthen the research and technological capabilities of CSIR–Central Road Research Institute (CSIR-CRRI) through funding support, modernization of laboratory and testing facilities, promotion of collaborative and sponsored research with Central and State agencies, and encouragement of technology development and commercialization. Efforts are also being made to facilitate pilot projects, field demonstrations and wider adoption of CSIR-CRRI technologies by industry and implementing agencies, while promoting advanced research in areas such as sustainable road materials, pavement recycling, traffic and mobility studies, intelligent transport systems and road safety.

This information was given by the Minister of State (Independent charge) for the Ministry of Science and Technology & Earth Sciences Dr. Jitendra Singh in a written reply in the Lok Sabha today.

The CSIR–Central Road Research Institute (CSIR-CRRI) has spearheaded several "Waste-to-Wealth" and sustainable infrastructure technologies over the last three years. The brief summary of these achievements and their field-level implementation by Indian agencies is as under:

Sustainable Pavement Materials & Waste Valorization		
S.No.	Technology	Implementation
1.	ECOFIX (Steel Slag Pothole Mix): A ready-to-use repair mix using processed steel slag	Used for rapid/monsoon repairs across 11 Indian states (including Delhi, Maharashtra, and Tamil Nadu) and exported to Chicago, USA
2.	Steel Slag Valorization: Processes industrial steel slag as a high-strength substitute for natural stone aggregates	Large-scale adoption in NH-66 (Mumbai–Goa), NH-53 (Gujarat), and strategic Border Roads in Arunachal Pradesh
3.	KrishiBind (Bio-Bitumen): Produces a renewable binder from agricultural waste (rice straw) to curb stubble burning	Tested on NH-6 (Meghalaya) and NH-44 (Maharashtra) to improve moisture resistance in highways
4.	End-of-Life Plastic Modules: Modular road components made from recycled plastic	Demonstration sections at the DND–KMP Expressway and an Indian Army camp in Leh
Advanced Recycling & Rejuvenation Technologies		
5.	REJUPAVE & REJUBIT: Bio-based modifiers that "refresh" aged bitumen, allowing for high-percentage Reclaimed Asphalt Pavement (RAP) usage	REJUPAVE is widely used by the BRO for low-temperature paving in Ladakh and Arunachal Pradesh. REJUBIT has covered 140 km of high-traffic corridors like the Chennai–Tirupati section
6.	TERASURFACING: Thin surfacing using industrial wastes (slag, fly ash, marble dust)	Commercialized and implemented in Surat, Gujarat for sustainable urban road maintenance
Specialized Surfacing & Stabilization		

7.	MSS+ & MACROSURFACING: Cold-mix surfacing for rural roads (MSS+) and preventive maintenance for concrete roads (MACROSURFACING)	MSS+ is active in PMGSY projects across five districts in UP; MACROSURFACING is used for rapid restoration of concrete pavements in Uttar Pradesh
8.	BSS101 & CGBR101: Specialized cementitious materials for soil stabilization and "semi-rigid" composite pavements	BSS101 used in NH sections near Kanpur and Shimla; CGBR101 (Cement Grouted Bituminous Mix) has been laid over 200 km in diverse climates from Mumbai (high rain) to Leh (extreme cold)
Mechanization & Noise Mitigation		
9.	PatchFILL (Machine & Mix): An indigenous pothole-filling machine and a two-pack quick-setting cold mix	Machines deployed in Kerala and Delhi; Two-pack mix utilized by Pune Municipal Corporation and on the Delhi–Mathura Road
10.	Mobile Cold Mixer-cum-Paver (MCMP): A mobile unit for on-site paving in remote areas	Prototype provided to the BRO for road works in the difficult terrains of Uttarakhand and Himachal Pradesh
11.	Frequency-Based Noise Barriers: Patented barriers tailored to specific traffic noise frequencies	Currently being installed along major road corridors in Delhi to mitigate urban noise pollution

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