

GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

RAJYA SABHA

UNSTARRED QUESTION No. 443
(TO BE ANSWERED ON. 06.02.2025)

STEEL SLAG ROADS

443 # Shri Subhash Barala:

Will the Minister of **SCIENCE AND TECHNOLOGY** be pleased to state:

- (a) whether CSIR-Central Road Research Institute (CSIR-CRRI) has developed steel slag road technology;
- (b) if so, details thereof and the advantages of steel slag roads technology over the regular technology of road construction; and
- (c) the details of schemes of CSIR-Central Road Research Institute (CSIR-CRRI) with respect to steel slag roads?

ANSWER

THE MINISTER OF STATE (INDEPENDENT CHARGE) OF
SCIENCE AND TECHNOLOGY AND EARTH SCIENCES
(DR. JITENDRA SINGH)

- (a)&(b) Yes, Sir. CSIR-Central Road Research Institute, a constituent laboratory of Council of Scientific and Industrial Research (CSIR) has developed Steel Slag Road Technology to facilitate sustainable waste utilization of Industrial waste of steel industries i.e. Steel Slag. India is the world's second largest steel producer. For every ton of steel production around 150 to 200 kg. steel slag is generated as solid waste. The majority of this slag after partial metal recovery disposed off as land fill which is causing land, air and water pollution. Around 15 million tons of steel slag is generated annually in India and this quantity is expected to reach 60 million tons per annum with the expected capacity augmentation in Indian Steel plants to the tune of 300 million tons per annum as per the national steel policy. CSIR-CRRI has facilitated valorisation of waste Steel Slag as processed steel slag aggregates for road construction which can be utilized as 100% substitute of natural aggregates in different road layers. The details of roads built utilizing CSIR-CRRI's Steel Slag Technology is at **Annexure-I.**

The advantages of Steel Slag Road Technology over the regular technology of road construction is as under:

- Eco-friendly sustainable industrial waste utilization in road construction
- Conservation of natural aggregates used conventionally for road

construction activities

- Prevention of unsustainable mining and quarrying of rocks for natural resources
- Improved durability of roads with better service life
- Higher load resistance capacity
- Negligible maintenance cost
- Reduced road thickness thus 25 to 30% economical in 100 km radius of steel plants
- Reduction in Green House Gas Emission and carbon footprint of road construction

(c) CSIR-CRRI has taken following initiatives in respect of Steel Slag Road:

- To facilitate steel slag road construction, CSIR-CRRI under the sponsored research project by the Ministry of Steel has developed the “National Guidelines for Processing and Utilization of Steel Slag as Processed Steel Slag Aggregates in Road Construction”. The guidelines were released on 30th June 2024 and published by the Ministry of Steel.
- CSIR-CRRI for valorisation of steel slag as processed steel slag aggregates for steel slag road construction has extended R&D support to leading steel industries in India i.e. TATA Steel, AMNS India, JSW Steel and Rashtriya Ispat Nigam Limited. Further institute under the sponsored R&D projects facilitating conversion of Steel Slag as processed steel slag aggregates at Jindal Steel and Power Limited Raigarh and Angul plants with ARJAS Steel, Tadipatri Plant at Andhra Pradesh.
- CSIR-CRRI is also rendering technical support and guidance including field supervision for Steel Slag Road construction to various road construction agencies in India including BRO, NHAI, ADANI Ports etc.
- CSIR-CRRI is also developing Web GIS portal for mapping of steel plants and steel slag aggregates on pan India basis for large-scale adoption of steel slag road technology.

The details of roads built utilizing CSIR-CRRI's Steel Slag Technology is as under:

- 1) **Gujarat:** India's first six lane steel slag road connecting NH-6 to Hazira port was constructed in May, 2022 at Surat Hazira under CSIR-CRRI technological guidance and supervision using processed steel slag aggregates as substitute of natural aggregates in all layers of bituminous pavement. In this 1 km long test section, processed Electric Arc Furnace (EAF) slag from Arcelor Mittal Nippon Steel (AMNS) steel plant at Hazira has been used.
- 2) **Arunachal Pradesh:** Border Road Organization under CSIR-CRRI technological guidance and support has utilized the technology for construction of Steel Slag Road at Ziro, Arunachal Pradesh using Processed Steel Slag supplied by TATA Steel Jamshedpur Plant. Processed steel slag were utilized in the construction of bituminous road at Kurung Kumey district under Project Arunank of BRO. This road connects Joram and district headquarters Koloriang via Palin in Arunachal Pradesh and laid in December 2022.
- 3) **Maharashtra:** India's First National Highway Steel Slag Road Section was built on NH-66 Mumbai Goa at Dolvi Maharashtra under CSIR-CRRI technological guidance and supervision using processed CONARC Steel Slag aggregates of JSW Steel Dolvi plant. Construction of this 4 lane bituminous and concrete steel slag road section was completed in June 2023 and since then it is functional for traffic movement.
- 4) **Jharkhand:** A four lane, 44.2 Km long stretch from Saherbera to Mahulia section of NH-33 near Jamshedpur is also built using processed steel slag aggregates of TATA Steel Jamshedpur plant as per CSIR-CRRI technological demonstration and guidance. Processed steel slag aggregates were utilized in granular layers of the road.
