



Steel Slag Roads Can Cut Construction Cost by 40%, Deliver Four Times Higher Strength: Dr Jitendra Singh

Minister Calls for Scaling Up Indigenous Steel Slag Road Technology Across States, Government Departments and Private Sector

This initiative simultaneously lives up to more than one flagship priorities of this government including PM Shri Narendra Modi's repeated emphasis on "Waste to Wealth" recycling options: Dr Jitendra Singh

From 1.85-km Guinness Record to 40-km Odisha Road: CSIR-CRRI and Jindal Steel Set to Create Next Milestone

Union Minister Says Roads Built with Steel Slag Technology Could Require Major Maintenance Only After Nearly 15 Years

“From One Project to Many Projects, From One State to Many States”: Dr Jitendra Singh Pushes Wider Adoption of Steel Slag Road Technology

India Sets Guinness World Record with World's Longest Steel Slag Road at Raigarh, Chhattisgarh

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Steel Slag Road Technology can reduce road construction costs by around 40 per cent while delivering four times the strength of conventional roads, Union Minister of State (Independent Charge) for Science & Technology and Earth Sciences, MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh, said today. He said the technology can also substantially extend the maintenance cycle, with maintenance required only after about 15 years in suitable applications, making it a breakthrough with implications not only for road engineering but also for the overall infrastructure economy.

Dr Jitendra Singh called for the indigenous technology to move from one project to many projects and from one State to many States, with its adoption extending beyond the Ministry of Road Transport and Highways to Railways, other Government departments, State Governments and private builders, contractors and infrastructure operators.

Dr Jitendra Singh was speaking at the conferment of the Guinness World Record for the “World’s Longest Road Built with Processed Steel Slag Aggregates”, jointly pursued by CSIR-Central Road Research Institute (CSIR-CRRI) New Delhi and Jindal Steel Limited. The 1.85-km road at Raigarh, Chhattisgarh, marks a major scale-up of an indigenous technology that converts processed steel slag, a by-product of steel production, into aggregates for road construction. The programme also witnessed the virtual inauguration of the road, release of a scientific documentary, signing of a Technology Transfer Agreement between CSIR-CRRI and Jindal Steel, launch of the “Steel Grit” brand and recognition of the project team.

Dr Jitendra Singh said this successful initiative simultaneously lives up to more than one flagship priorities of this government including PM Shri Narendra Modi's repeated emphasis on "Waste to Wealth" recycling options.

Among those present were Shri Naveen Jindal, Member of Parliament, Chairman, Jindal Steel and President, Indian Steel Association; Dr N. Kalaiselvi, Secretary, DSIR and Director General, CSIR; Dr V.K. Saraswat, former Member, NITI Aayog and former Director General, DRDO; Dr Ch. Ravi Sekhar, Director, CSIR-CRRI; representatives of Guinness World Records, scientists, engineers, industry leaders and members of the media.

Dr Jitendra Singh said the achievement demonstrates how industrial waste can be transformed into infrastructure wealth through Indian science, technology and industry working together. He said India’s rapidly expanding highways, expressways, industrial corridors, ports and urban infrastructure also bring a growing responsibility to conserve natural resources; particularly natural aggregates obtained through mining and quarrying. The Steel Slag Road initiative provides a technology-driven pathway to address both challenges, productive utilisation of an industrial by-product and conservation of natural resources.

The Minister said the significance of the technology becomes even greater in a geographically diverse country like India, where conventional roads often face durability challenges in difficult terrain and high-rainfall regions. Recalling his seven-year association with the Northeast, he said road construction in several areas is restricted to four or five months because of heavy rainfall, while portions constructed during one season can suffer damage before the next construction cycle begins. Stronger and more durable road technologies can therefore provide particular value in such challenging geographies.

Dr Jitendra Singh also referred to the changing traffic profile of rural roads. Roads originally constructed to connect villages and cater primarily to light vehicles can, with economic development, find themselves carrying heavy trucks and commercial traffic when the surrounding areas evolve into industrial zones. He said such changes reinforce the need for road technologies capable of meeting higher loads and longer durability requirements.

Calling for a concerted awareness drive, Dr Jitendra Singh said road construction is not confined to MoRTH. Railways and several other Government departments also construct roads and heavy-duty infrastructure, while private builders, contractors and infrastructure operators represent another major area for adoption. He called for greater inter-ministerial and inter-State engagement, including dedicated awareness programmes, so that engineers and implementing agencies are familiar with the technology and can assess its suitability for their respective projects.

The Minister said the objective should now be to take the technology “from one project to many projects, from one State to many States” and eventually make proven indigenous innovations part of mainstream infrastructure practice. CSIR-CRRI’s scientific guidelines, processing protocols and quality-control framework provide the basis for technically sound adoption, while Government agencies, scientific institutions, industry and infrastructure developers can work together to accelerate implementation wherever the technology is technically and economically appropriate.

Dr Jitendra Singh described the initiative as an example of “whole-of-government plus whole-of-nation” collaboration, bringing together Government, research institutions, industry and engineers. He said the technology is indigenous in both its conception and application, and that the next phase must focus on creating greater awareness and stronger pathways for home-grown technologies to move from laboratories and demonstration projects to large-scale field implementation.

The Minister placed the Steel Slag Road initiative within the larger Waste to Wealth and circular economy vision. He said India must increasingly move away from the mindset that any material is simply waste, as science and technology can unlock new economic value from such resources. Referring to CSIR initiatives involving biofuels from used cooking oil and the recovery of value from electronic scrap, he said recycling and resource recovery will form an increasingly important part of the next phase of industrial development.

Dr. Jitendra Singh also congratulated Dr Satish Pandey and the CSIR-CRRI team for their sustained work and passion in taking the technology from research to the field. He said scientific talent requires an opportunity to demonstrate its potential, and credited Jindal Steel for providing the scale and platform through which the technology could be demonstrated in real-world infrastructure. He expressed hope that more steel companies would come forward to collaborate with scientific institutions on similar technology-led solutions.

The technology has already travelled through a series of landmark applications. Beginning with a major demonstration at Hazira, Gujarat, processed steel slag aggregates were used in a six-lane road connecting the industrial area with Hazira Port. It subsequently reached the NH-66 Mumbai-Goa Highway, where approximately 80,000 tonnes of steel slag were converted into processed aggregates for a one-kilometre, four-lane road section. The technology was also deployed for heavy-duty road infrastructure in Arunachal Pradesh, including the strategic border region.

The technology has also entered port infrastructure through a 1.1-km steel slag road inside Hazira Port, connecting the multi-Purpose Berth with the coal yard. The application demonstrates the potential of processed steel slag aggregates for demanding industrial and logistics environments when supported by appropriate processing, pavement design and quality control.

The 1.85-km Guinness World Record is already paving the way for a much larger milestone. Dr N. Kalaiselvi, Secretary, DSIR and Director General, CSIR, said the achievement comes as CSIR prepares to enter its 85th year and represents a particularly significant milestone for the organisation. She announced that CSIR-CRRI has received a work order for a 40-km road in Odisha from Jindal Steel’s Angul plant, taking the technology from the present 1.85-km Guinness record towards a 40-km implementation. She said CSIR-CRRI and Jindal Steel are now poised to break their own record with this next milestone.

Dr Jitendra Singh said the Guinness World Record should be regarded not as the destination but as the beginning of the next phase of adoption. He said the real success would come when the technology is replicated across the country wherever technically and economically suitable. The Minister called for stronger engagement with Government departments, States and private infrastructure players so that an innovation developed in India can become a widely used infrastructure solution in India.

He said the Steel Slag Road initiative brings together science and industry, waste and wealth, innovation and infrastructure, and research with the needs of society. The achievement, he said, demonstrates that India is increasingly moving beyond developing indigenous technology to taking indigenous technology to scale, creating infrastructure that is economically efficient, environmentally responsible and technically sound.

Dr Kalaiselvi said the achievement reflects the strength of the partnership between CSIR-CRRI and Jindal Steel, and thanked Shri Naveen Jindal and his team for their collaboration with CSIR. She congratulated the scientists and engineers, particularly Dr Satish Pandey, whose work has helped take the technology from its initial applications in Gujarat to the National Highway network, Arunachal Pradesh and now the Guinness World Record.

With the next 40-km Odisha project already in the pipeline, the journey now moves from a world record to wider national adoption, turning one successful project into many, one State into many States, and an industrial by-product into a valuable infrastructure resource.







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