

Ministry of Railways



Greener & More Energy Efficient; First Indigenous Hydrogen Train All Set to Start

10-Car Train with 1200 KW Engine Approved by Indian Railways to Operate at a Maximum Speed of 75 kmph on Jind-Sonipat Section

With this, India Joins Elite Club of Nations Using Hydrogen Fuel Cell Technology to Power Clean and Sustainable Rail Operations

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In a major step towards green and sustainable transportation, Indian Railways has approved the introduction of a 10-car Hydrogen Fuel Cell-based trainset on the dedicated Jind-Sonipat section of Northern Railway. The trainset is all set to start soon and will operate at a maximum speed of 75 kmph, powered by a 1200 KW hydrogen fuel cell propulsion system.



Hydrogen fuel cell technology generates electricity through a chemical reaction using hydrogen, with water vapour as the only emission, making it a clean alternative to conventional fossil fuel-based traction systems. Hydrogen-based rail systems are increasingly being recognised globally as a promising solution for sustainable mobility. With this initiative, India joins a select group of countries such as Germany, Japan, China and the United States that are exploring the use of hydrogen for cleaner rail transportation. As the technology is still at a nascent stage, only a limited number of countries are currently operating or testing such systems.

The Jind-Sonipat section in Haryana has been identified as the pilot route for these operations. An indigenous hydrogen storage and refuelling facility has been set up at Jind for the train-set. The Petroleum and Explosives Safety Organisation (PESO) has granted the required licence for storage and dispensing of compressed hydrogen gas at the site.

A hydrogen compression system has been provided for refuelling operations, along with necessary technical support and critical spares to ensure reliable and fail-safe functioning. Provision of a standby compressor unit is also being ensured. Various safety sensors, including hydrogen leak detectors and

flame detectors installed at the hydrogen production, storage and dispensing facility, will be regularly inspected and cleaned to prevent dust accumulation and ensure safe operation.

Operation and maintenance manuals for the hydrogen train-set and hydrogen plant, duly approved by RDSO, are also being made available. Necessary safety provisions, regular audits and standard operating procedures are being ensured for the proposed maintenance facility at Shakurbasti.

The approval also mandates comprehensive safety and operational protocols, including 24x7 monitoring of the hydrogen refuelling system, deployment of trained and certified personnel for critical operations, and regular inspection and maintenance schedules. During the initial phase of operations, trained technical staff will accompany the train to ensure smooth functioning.

The project reflects Indian Railways' broader commitment to innovation, energy efficiency and environmentally sustainable transportation and supports India's national clean energy and net-zero carbon emission goals.

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