GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

RAJYA SABHA
UNSTARRED QUESTION NO - 2190
ANSWERED ON - 11/03/2026

CLIMATE RESILIENT ROADS

2190. # SHRI CHUNNILAL GARASIYA:
SHRI SHAMBHU SHARAN PATEL:
SMT. KIRAN CHOUDHRY:
SHRI KESRIDEVSINH JHALA:
SHRI UJJWAL DEORAO NIKAM:

Will the Minister of ROAD TRANSPORT AND HIGHWAYS be pleased to state:

(a) whether special engineering standards and climate-resilient design features are being adopted for construction of roads and bridges in snowy, landslide-prone and flood-affected areas;

(b) if so, the details of these standards and techniques;

(c) whether these measures have brought about any reduction in disruptions to road connectivity on seasonal basis; and

(d) if so, the findings of any assessments/studies conducted in this regard?

ANSWER

THE MINISTER OF ROAD TRANSPORT AND HIGHWAYS

(SHRI NITIN JAIRAM GADKARI)

(a) to (b) National Highways (NHs) Projects including those sections of NHs passing through snowy, landslide-prone and flood-affected areas are planned, designed and constructed in accordance with the provisions of Indian Roads Congress (IRC) Guidelines. IRC has published several guidelines/standards/techniques such as 'IRC:52 Guidelines for the Alignment Survey and Geometric Design of Hill Roads', 'IRC:75(Part-2) Guidelines for Retrofitting Measures for Protection of Road Systems Including Surrounding Areas from Rainfall, Waterlogging and Flooding', 'IRC:138 Guidelines for Highway Engineers on Disaster Resilient Green Highways in Multi-Hazard Ecosystem', 'IRC: SP:48 Hill Road Manual', 'IRC: SP:106 Engineering Guidelines on Landslide Mitigation Measures', ' IRC:SP:113 Guidelines on Flood Disaster Mitigation for Highway Engineers' etc. specially for climate-resilient design and construction of roads and bridges in snowy, landslide-prone and flood-affected areas. Also, circulars have been issued from time to time on the basis of experience gained over the years.

(c) to (d) IRC guidelines are developed on the basis of global successful best practices adjusted to local climatic & load conditions and outcome of indigenous research. These guidelines have the provisions of selection of alignment/improvement option on the basis of landslide susceptibility map, design criteria such as highest flood level, rainfall intensity, seismic zone, exposure condition like corrosion resistant reinforcement, road building materials of bitumen duly considering prevailing maximum & minimum pavement temperature/frost resistant materials, landslide protection measures including avalanche protection, etc. NHs planned, designed and constructed duly considering project specific climatic factors/design parameters/materials results into resilient infrastructure resisting disruptions to road connectivity on seasonal basis.

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