



## Theme of Hackathon

**Innovation in Construction of Resilient Infrastructure in India**

Supported by



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Initiative partners





## Background

India's infrastructure is the backbone of its development journey – from roads, bridges, and railways to power plants, ports, and water systems. However, the growing frequency of **climate-induced disasters, rapid urbanization, and aging infrastructure** have exposed serious vulnerabilities.

In the last decade alone, India has faced floods, cyclones, heatwaves, landslides, and earthquakes that caused billions in losses and disrupted millions of lives. According to the National Disaster Management Authority (NDMA), nearly 58% of India's landmass is prone to earthquakes, 12% to floods, and 76 coastal districts are exposed to cyclones and rising sea levels.

To ensure the vision of *Viksit Bharat @2047*, India must adopt resilience as a core design and construction principle – making infrastructure adaptive, durable, and sustainable. This demands innovative ideas, technologies, and construction methods that can withstand shocks, recover rapidly, and continue to serve communities under stress.

## The Challenge

Develop **innovative, practical, and scalable solutions** that enhance the **resilience of infrastructure in India** – enabling it to **withstand, adapt to, and recover from natural or human-induced stresses** while ensuring safety, longevity, and sustainability.

# Problem Areas to Explore

Your solution should address one or more of the following key challenges in resilient infrastructure development and construction.

## Disaster-Resilient Design and Construction

- Develop innovative structural systems or materials that improve resistance to earthquakes, floods, cyclones, or landslides.
- Create retrofitting or reinforcement techniques for existing vulnerable infrastructure.
- Propose smart design tools or models for climate and disaster risk-informed infrastructure planning.

## Materials and Construction Technology for Resilience

- Innovate durable, low-maintenance, and locally available materials that resist corrosion, moisture, and heat degradation.
- Explore use of 3D printing, modular systems, or robotics for faster, safer recovery and reconstruction.
- Develop life-cycle assessment tools to evaluate resilience performance of materials and techniques.

# Expected Outcomes

Participants are expected to deliver:

- **Simulation, or concept model** that enhances resilience in one or more infrastructure sectors (transportation, water, power, housing, etc.).
- A **clear quantitative or qualitative benefit**, such as reduced downtime, enhanced disaster resistance, or improved material performance.
- A **roadmap for scaling and implementation**, especially in the Indian context (urban/rural, coastal/mountainous, etc.).

# Evaluation Criteria

**Innovation & Creativity**

**Feasibility & Technical Soundness**

**Impact Potential**

**Scalability & Sustainability**

**Implementation (Roadmap)**

**Presentation & Clarity**

## Inspiration Examples

- **Seismic-resilient low-cost housing** using modular steel or bamboo frames.
- **IoT-enabled bridge health monitoring systems** that alert authorities to structural stress.
- **Flood-adaptive roads and drainage systems** with self-draining materials.
- **3D-printed embankments** for rapid post-disaster reconstruction.
- **AI-driven infrastructure vulnerability mapping platforms** for smart cities.

## Goal

To empower civil engineers, innovators, and technologists to reimagine how India **plans, constructs, and maintains resilient infrastructure** — ensuring safety, sustainability, and uninterrupted service delivery in the face of uncertainty.

Together, let's build an India that not only grows — but **endures, adapts, and thrives.**