Thapar Institute of Engineering and Technology Patiala

(Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956)

Major Research Areas in the Department of Civil Engineering

1. Structural Health Monitoring (SHM) & Retrofitting of Structures
   - Damage detection and real time monitoring of civil infrastructures using: i. Vibration diagnostics, ii. Ultrasonic guided waves, iii. Acoustic emission, iv. Infrared thermography, v. Digital image correlation using high speed camera.
   - Retrofitting of structures using FRP, Ferro cement and UHP-HFRC
   - High Temperature Testing of Concrete elements

2. Structural Engineering
   - Passive vibration control, Seismic analysis of structures, Seismic Performance Assessment and Vulnerability Analysis of Structures
   - Wind, Reliability analysis of structures and High-speed strain loading, FEM Modelling, Reliability based design
   - Analysis of Composite Structures

3. Sustainable Construction Materials
   - Self-compacting concrete, Behaviour of concrete at elevated temperatures, Ultra-high-performance concrete, Bacterial concrete, Rebar corrosion protection, Pavement Materials, Geo-materials.

4. Water Resource & Environmental Engineering
   - Contaminate transport in groundwater Water quality modelling
   - Fluvial hydraulics
   - Water resources management
   - Flood risk analysis
   - Application of remote sensing and GIS in civil and environmental engineering

5. Transportation Engineering
   - Pavement Maintenance Management Systems for various categories of roads
   - Computer application for construction industry's challenges
   - Rheological properties of Paving Bitumen including modified binders
   - Mechanistic empirical structural design of pavements using various stabilized layers
   - Development of road safety methodology using sustainable design facilitating NMT and pedestrian traffic
   - Transportation planning and traffic impact studies

6. Geotechnical Engineering
   - Geotechnical earthquake engineering
   - Physical modelling in geotechnics, Reinforced earth structures
   - Ground improvement techniques
   - Underground structures and Foundation Engineering
   - Geo-materials and geotextiles