Outreach & Dissemination Services Office
CSIR – Central Building Research Institute
Roorkee – 247667 (UK)

Training Program on

'Safe Construction Practices'

August 18th-22nd, 2025

Organized under the aegis of CSIR Integrated Skill Initiative

A five-day training program on "**Safe Construction Practices"** commenced at the CSIR–Central Building Research Institute (CSIR-CBRI), Roorkee, under the aegis of the CSIR Integrated Skill Initiative program. Scheduled from **August 18th-22nd, 2025** the program is being conducted in collaboration with the Himachal Pradesh State Disaster Management Authority (**HPSDMA**) and coordinated by **Er. Ashish Pippal, Principal Scientist**, CSIR-CBRI Roorkee. The program is designed to strengthen the knowledge and skills of engineers, and the professionals in adopting safe construction practices. It emphasizes quality control, proper material usage, adherence to building codes, and techniques to ensure structural durability and safety. Special focus is given to site safety measures, good workmanship, and disaster-resilient construction methods to minimize risks and enhance the overall safety and sustainability of buildings.

The training program was formally inaugurated by **Dr. D.P. Kanungo, Chief Scientist and Dr. Ajay Chourasia, Chief Scientist** in the presence of distinguished dignitaries including Sh. Nadeem Ahmad, Dr. Tabish Alam, Dr. Naveen Nishant, along with ODS staff members Mr. Ajay, Ms. Sanskriti Sharma, Ms. Iqra, Ms. Rashi, Mr. Anuj, Mr. Rajat, and others. Welcoming the participants, Dr. Ajay Chourasia commended the enthusiastic involvement of engineers from Himachal Pradesh and emphasized that such technical workshops are vital in bridging the gap between theoretical knowledge and practical field applications. In his inaugural address, Dr. D.P. Kanungo highlighted the significance of adopting safe construction practices to mitigate disaster risks, particularly in vulnerable hilly regions. He remarked, “Good construction is the foundation of safe living. By integrating scientific knowledge with practical training, engineers can ensure resilient structures capable of withstanding natural hazards.” He also briefed participants about CSIR-CBRI’s mission, expertise, and ongoing research in disaster-resilient and sustainable construction technologies. The vote of thanks was delivered by Sh. Nadeem Ahmad, Chief Scientist, who warmly welcomed all participants and extended his best wishes for a productive training experience. He acknowledged the organizing team for their dedicated efforts and stressed the importance of collaborative learning in advancing disaster preparedness. The five-day training program will include expert lectures, technical sessions, laboratory and field visits, and hands-on demonstrations. This initiative reflects the shared commitment of CSIR-CBRI and HPSDMA to enhance the capacity of engineers and professionals in adopting safe construction practices, thereby ensuring long-term safety, resilience, and sustainability in disaster-prone regions. CSIR-CBRI remains dedicated to its mission of translating scientific research into real-world solutions for building a safer and disaster-resilient India.

Key Learning Sessions & Activities

Day 1 (August 18, 2025)

Session 1: The session began by **Dr. Ajay Chourasia, Chief Scientist, CSIR–CBRI Roorkee,** commenced with an overview of **Design of Confined Masonry Buildings in Hills** and its relevance to seismic safety. He elaborated the **challenges of hilly terrains, including steep slopes, irregular ground conditions, and limited accessibility**, and explained how confined masonry with RC bands, vertical ties, and proper wall bonding enhances stability and earthquake resistance. The **session highlighted the significance of site selection, slope protection, and drainage to mitigate hazards like landslides, erosion, and water seepage**. Dr. Ajay Chourasia also discussed the role of design guidelines such as IS 13828 for earthquake-resistant construction in hill areas and addressed the practical difficulties in their application. Examples of strength techniques such as jacketing of columns, use of steel bracings, and wall stitching were presented to enhance the safety of critical public and residential buildings. The **presentation emphasized socio-technical considerations, capacity building of local masons, and the need for inclusive disaster risk reduction strategies**.

Technical session by Dr. Ajay Chourasia

Lab Visits

Visit to NEETF & 3-D Printing Structural Eng. Laboratory

Session 2: The session by **Dr. Anindya Pain, Principal Scientist, CSIR–CBRI Roorkee**, commenced with an overview of Design and Construction of Foundations in Hills and its importance for safe and durable structures in hilly regions. He elaborated the challenges of steep slopes, irregular terrain, and varying soil conditions, and explained how stepped and tiered foundation systems improve stability. **The session highlighted critical aspects such as proper site selection, slope cutting and filling, drainage provisions, and retaining structures to prevent erosion and landslides.** He also shared practical insights and examples, demonstrating how well-designed foundations can ensure safety and longevity in seismically active hill areas.

Technical session by Dr. Anindya Pain

Day 2 (August 19, 2025)

Session 1: In the session, **Er. Ashish Kapoor**, **Scientist** delivered an insightful session on **Non-Destructive Testing (NDT)** methods, emphasizing their role in **quality control and fast-track testing** of structures. He introduced key concepts related to **IS 1893**, and discussed the significance of **peak ground acceleration** in understanding the impact of earthquakes on structures. The session elaborated on the **procedures for structural evaluation** and the importance of conducting assessments without causing damage to existing infrastructure. He outlined the **purpose, objectives, advantages, and limitations** of NDT, and stressed the need for reliable deliverables. **A major highlight of the session was the Rebound Hammer Test, referring to IS 516 (Part 5): 2020, which is used to assess the surface hardness and estimate the compressive strength of concrete**. The practical relevance of NDT methods in **structural retrofitting, maintenance, and seismic risk assessment** was strongly emphasized, making it a valuable tool in modern civil engineering practices.

Technical session by Er. Ashish Kapoor

Session 2: The session by **Dr. Naveen Nishant, Scientist, CSIR–CBRI**, focused on *Building Bylaws and Their Importance in Safe Construction*. He explained the role of building regulations in ensuring structural safety, planned development, and disaster resilience. The session highlighted key provisions related to site selection, building height, setbacks, and occupancy, particularly in hazard-prone areas. Dr. Nishant discussed common challenges in enforcing bylaws and the need for strict compliance to reduce risks. Practical examples were shared to show how well-implemented bylaws contribute to safer and more sustainable built environments.

Technical session by Dr. Naveen Nishant

Session 3: The session by **Er. Ashish Pippal, Principal Scientist, CSIR–CBRI**, focused on *Understanding Slope Stabilization Measures* in hilly regions. He explained the challenges posed by steep gradients, unstable soils, and water-induced erosion, which increase the risk of slope failures. The session highlighted key techniques such as retaining walls, soil nailing, rock bolting, drainage management, and vegetation cover to enhance stability. He also discussed the importance of proper site assessment and design planning to minimize landslide risks and ensure the safety of structures built on or near slopes.

Technical session by Er. Ashish Pippal

Session 4: The session by **Er. M. M. Dalbehera, Principal Scientist, CSIR–CBRI**, focused on *Construction Technologies for Hilly Regions* and the need for innovative solutions suited to challenging terrains. He explained the importance of minimizing large-scale excavation and adopting slope-friendly layouts to preserve natural stability. The session introduced technologies such as modular and pre-engineered structures for faster assembly, use of local stone and timber to reduce transportation challenges, and anchoring techniques for stability on sloping ground. He

focused on the role of retaining structures, soil reinforcement, and eco-friendly materials to improve safety and sustainability. He also stressed the integration of disaster-resistant features and cost-effective methods to ensure durable construction in remote hill areas.

Technical session by Er. M.M. Dalbehera

❖ Lab Visit

Lab Demonstration of FSE, Group

Demonstration of Rural Technology Park

Advance Concrete, Steel & Composites Lab

Day 3 (August 20, 2025)

Session 1: The day began with an interesting session by **Er. Sugam Prajapati, Technical Officer** on the "***Preparation and Understanding of Technical Drawings*.”**, where he the importance of clear and accurate drawings as the foundation for successful construction, especially in complex terrains. The session covered essential elements such as plan views, elevations, sections, and detailing of structural components. Er. Sugam Prajapati emphasized the need for precision in scale, dimensions, and annotations to avoid errors during execution. Practical examples were shared to illustrate how well-prepared drawings improve communication among engineers, architects, and site teams, ensuring quality and safety in construction projects.

Technical session by Er. Sugam Prajapati

Session 2: The session by **Er. I.A.Siddiqui**, **Senior Technical Officer, CSIR–CBRI**, This session highlighted *the importance of Detailed Project Reports (DPRs), e-tendering, and cost management in construction projects*. Er. Siddiqui explained the stepwise preparation of DPRs covering feasibility studies, estimates, rate analysis, quantity take-offs, and bar bending schedules. Different types of estimates (preliminary, detailed, revised, supplementary) were discussed along with methods like centre line and crossing for quantity calculations. The presentation also covered repair and retrofitting strategies, local and global strengthening techniques, and analysis of construction rates. The importance of accurate costing, documentation, material management, and manpower planning to avoid overruns was stressed, along with emerging practices like modular plans and digital cost monitoring.

Technical session by Er. I.A.Siddiqui

Session 3: The session by **Er. Kanti Solanki, Scientist, CSIR-CBRI** focused on *how Internet of Things (IoT) technologies can improve disaster preparedness, response, and recovery*. It began with an introduction to IoT, its components, sensors, and communication systems. Case studies and examples illustrated IoT applications in early warning systems, infrastructure monitoring, and real-time data collection for hazards like earthquakes, floods, and avalanches. The presentation highlighted the role of cloud-based dashboards, remote sensing, and community-level awareness in enhancing resilience. It also emphasized integration with urban planning and addressed challenges in adoption, including training, policy, and safety considerations.

Technical session by Er. Kanti Solanki

Visit to Demonstration Park

Day 4 (August 21, 2025)

Field visit

The field visit focuses on monitoring the Narendra Nagar landslide area using an Acoustic Emission Sensor System. The scope of work includes construction of boreholes for sensor installation**,** installation of a weather station to study local weather patterns**,** periodic monitoring of surface movements with a Total Station System, and acoustic data collection and analysis in collaboration with SSPL**.** In the field work**,** four boreholes were drilled at strategic locations**, and** 25 rust-proof steel markers (1450mm total height) were installed. Aluminium pipes with piezoelectric sensors were placed in these boreholes for data capture. For support systems**, a** flexible pipe (62.5mm diameter, ~550m length) was laid for wiring protection, a weather station data logger was installed to record parameters like rainfall, temperature, humidity, wind, pressure, and solar radiation, and an acquisition system was set up in a hut at DOR Village with a Total Station pillar to ensure continuous monitoring.

Day 5 (August 22, 2025)

Session 1: The session by **Er. Chandrabhan Patel, Scientist, CSIR–CBRI**, focused on Structural Health Monitoring Using Vibration-Based Analysis. He explained the importance of sensors in assessing the safety and performance of buildings and infrastructure. The session covered different types of sensors, their placement in critical structural elements, and how changes in vibration frequency can indicate potential damage. Er. Patel discussed methodologies for identifying and locating damage, emphasizing the role of real-time data in maintenance and safety planning. Practical insights were shared on using sensor networks to ensure timely detection and improve structural reliability.

Technical session by Er. Chandrabhan Patel

Session 2: The session by Er. H. K. Jain, (Retired Principal Technical Officer), CSIR–CBRI, focused on Hints for Quality in Building Construction. He highlighted the importance of good practices at every stage, from planning to execution, to ensure durability and safety. The session covered critical points like proper material selection, correct mixing and curing of concrete, adequate reinforcement detailing, and maintaining workmanship standards. Er. Jian emphasized site supervision, timely testing, and adherence to specifications as key to avoiding defects and failures. Practical suggestions were shared to help improve overall quality and performance of buildings.

Technical session by Er. H.K. Jain

Valedictory ceremony

The five-day training program "Safe Construction Systems" organized from **18th August to 22nd August 2025** at **CSIR-Central Building Research Institute (CBRI), Roorkee** concluded successfully. This program was organized in collaboration with **Himachal Pradesh State Disaster Management Authority (HPSDMA) under CSIR Integrated Skill Initiative**. The program was coordinated by **Er. Ashish Pippal, Principal Scientist**. The objective of this training was to provide practical knowledge about safe construction techniques, quality control, building code compliance, and disaster-resilient construction to engineers, architects and technical personnel associated with the construction sector. During the training, practical experience was provided to the participants through lectures, technical sessions, case studies and experimental demonstrations by experts. The participants actively participated and appreciated the program. The valedictory session was chaired by **Chief Scientist, Dr. D.P. Kanungo**, who highlighted that safe construction is not only a technical requirement but also a social responsibility. He praised such initiatives for driving change at the grassroots level. On this occasion, the **Director** of the Institute, **Prof. R. Pradeep Kumar**, while addressing the program, emphasized the need to include

structural safety in the academic courses. He inspired the participants to apply the knowledge gained in local projects and disaster management strategies. Special thanks were expressed for the leadership and guidance of the Director, under whose visionary leadership such training programs have been possible. Practical training, innovation and industry-academia collaboration encouraged by him have become the distinctive identity of the Institute. The program concluded with the vote of thanks by Er. Ashish Pippal. He appreciated the efforts of the participants, expert speakers and the whole ODS organizing team and urged the participants to actively participate in the activities of the Institute in future as well. In the end, training certificates were provided to all the participants. This five-day training program proved to be an important educational and technical experience for the participants, which inspired them to promote safe, sustainable and innovative construction practices in their areas.

Certificates distribution

List of Participants

Sr. No.	Name of Official	Department	Designation
1.	Sh. Mohan Lal	Urban Development (Nagar Panchayat Rajgarh)	Junior Engineer
2.	Sh. Mukesh Kumar	M.C Paonta Sahib	Junior Engineer
3.	Sh. Gaurav Saini	M.C Paonta Sahib	Work Supervisor
4.	Sh. Parveen Kumar	HPPWD Paonta Division	Junior Engineer
5.	Sh. Aditya	HPPWD Shillai Division	Junior Engineer
6.	Sh. Amit Chauhan	HPPWD Nahan Division	Junior Engineer
7.	Sh. Lalit Goyal	M.C Nahan	Junior Engineer
8.	Sh. Nagender Dutt Sharma	Zila Parishad	Assistant Engineer
9.	Sh. Dinesh Sharma	Zila Parishad	Junior Engineer
10.	Sh. Yashpal	Zila Parishad	Junior Engineer
11.	Sh. Arun Thakur	Dev. Block Pachhad	Junior Engineer
12.	Sh. Sanjeev Parashar	Dev. Block Pachhad	Technical Assistant
13.	Sh. Satpal	Dev. Block Shillai	Technical Assistant
14.	Sh. Jagatram	Dev. Block Shillai	Technical Assistant
15.	Sh. Tej Ram Sharma	Dev. Block Paonta Sahib	Technical Assistant
16.	Sh. Surendra Pal	Dev. Block Paonta Sahib	Technical Assistant
17.	Ms. Anjli Kumari	Dev. Block Sangrah	Technical Assistant
18.	Sh. Sanjeev Kumar	Dev. Block Sangrah	Technical Assistant
19.	Ms. Poonam Devi	Dev. Block Pachhad	Technical Assistant
20.	Ms. Reeta Kumari	Dev. Block Rajgarh	Technical Assistant
21.	Sh. Bhagat Singh	Dev. Block Nahan	Junior Engineer
22.	Sh. Rajesh Kumar	Dev. Block Nahan	Technical Assistant
23.	Sh. Dalip Sharma	Dev. Block Kamaru at Tilordhar	Junior Engineer
24.	Sh. Naresh Panwar	Dev. Block Kamaru at Tilordhar	Technical Assistant
25.	Sh. Vinod Kumar	RD & PR Department Bhoranj	Junior Engineer
26.	Sh. Rajinder Kumar	RD & PR Department Bhoranj	Technical Assistant
27.	Sh. Suresh Kumar	RD & PR Department Bhoranj	Technical Assistant
28.	Sh. Rahul Chopra	RD & PR Department Bhoranj	Technical Assistant
29.	Sh. Manjeet S. Rangra	RD & PR Department Sujanpur	Technical Assistant
30.	Sh. Ajay Kumar	RD & PR Department Sujanpur	Technical Assistant
31.	Sh. Dhiraj Gupta	RD & PR Department Sujanpur	Technical Assistant
32.	Sh. Kamal Jeet Singh	RD & PR Department Sujanpur	Technical Assistant
33.	Sh. Ankit Rihal	RD & PR Department Nadun	Technical Assistant

Schedules of the Training Program

Hours	***18.08.2025***	***19.08.2025***	***20.08.2025***	***21.08.2025***	***22.08.2025***
9:30 AM	Registration & Inauguration – ***Director, CBRI***	*Recapitulation of 1st Day*	*Recapitulation of 2nd Day*	***Field Visit*** ***Er. Rajnish & Team***	*Recapitulation of 3rd Day*
10:00-11:00		Use of Non-Destructive Testing Methods in Structural Assessment ***Er. Ashish Kapoor***	Structural Health Monitoring using Vibration-Based Analysis ***Er. Chandrabhan Patel***		Preparation & Understanding of Technical Drawings ***Er. Sugam Prajapati***
11:00	***High Tea Break***				
11:15-12:15	Design of Confined Masonry Buildings in Hills ***Dr. Ajay Chourasia***	Building Bye-Laws ***Ar. Naveen Nishant***	Construction cost management & recent trends in DPR Preparation ***Er. I.A. Siddiqui***		Aspects of Building Services ***Er. H.K.Jain***
12:15-13:15		Understanding of Slope Stabilisation Measures ***Er. Ashish Pippal***			Feedback, Discussion & Valediction
13:15-14:15	***Lunch Break***				
14:15-15:15	Design & Construction of Foundations in Hills ***Dr. Anindya Pain***	Construction technologies for hilly regions ***Er. M.M.Dalbehera***	Enhancing Disaster Resilience with IoT ***Er. Kanti Solanki***		**********
15:15	***High Tea Break***				
15:45-17.30	Visit to Laboratories ***Er. Rajat & Er. Anuj***	Visit to Laboratories ***Er. Rajat & Er. Anuj***	Visit of Demonstration Construction Park- ***Er. Rajnish***		**********