

## Central Building Research Institute

**T**he Central Building Research Institute, Roorkee, India, has been vested with the responsibility of generating, cultivating and promoting building science and technology in the service of the country.

Since its inception in 1947, the Institute has been assisting the building construction and building material industries in finding timely, appropriate and economical solutions to the problems of materials, rural and urban housing, energy conservation, efficiency, fire hazards, structural and foundation problems and disaster mitigation. The Institute maintains linkages with international bodies like CIB, Netherlands; TWAS, Italy; BRE, U.K.; ASTM, U.S.A.; CSIRO, Australia; RILEM, France; BRS, Canada and UNCHS, Nairobi, Kenya.



At the national level, the Institute has close interaction with BMTPC, HUDCO, DST, Ministry of Urban Development, Ministry of Rural Areas, Housing Boards and Societies of the State Governments, engineering and academic institutions, construction and building material industries

## R&D Divisions

- Building Processes
- Clay Products
- Construction & Extension
- Efficiency of Buildings
- Education & Health Buildings
- Environmental S&T
- Fire Engineering
- Geotechnical Engineering
- Housing & Planning
- Organic Building Materials
- Polymers Plastics & Composite
- Rural Building & Env.
- Structural Engineering

## Technology Showcase

<b>CBRICK</b> Clay Flyash Bricks Polytiles Coir-CNSL Board Coir-Cement Board Sislana Panels IPN-CON Coating IPN-RB Coating EPS Door Shutter Gypsum Binder Phosphogypsum	<b>Brick Making Machine</b> High Draught Kiln Vertical Shaft Lime Kiln Lime Kiln Pollution Control Device Gypsum Calcinator Lime Hydrated Machine Sand Lime Brick Plant Termite Control Building Pests Pile Integrity Testing	<b>Electric Curing of Concrete</b> Concrete Block Making Machine Boring and Skirting Machine Mini Climbing Crane Automatic Free Fall Hammer Building Material Expertise Construction Technologies Planning and Design Software Cable Firestop Calfire Fire Resistant Door
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## S&T Know-How

- Bricks & Kilns
- Lime Kiln
- Clay Products
- Gypsum Products
- Concrete Products
- Building Machines
- Pile Foundation
- Epoxy-phenolic Coating
- EPS Door Shutters
- Waterproofing & Paints

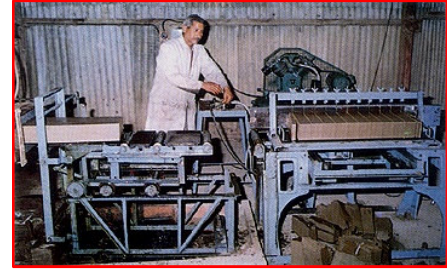




**Termite Control Lab**



**Lime Kiln**



**Clay Products**

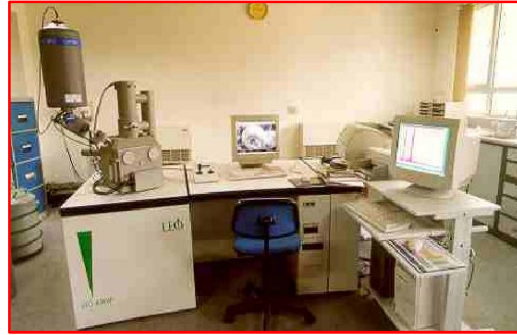
## Facilities

### Testing Facilities

1. Operation and performance requirements of cisterns for water closets and urinals (IS: 774 - 1984) reaffirmed 1990
2. Flushing tests of wash down water closet/squatting pans (IS: 2556 - 1981).
3. Testing of pre-stressed concrete poles (IS: 2905 1989, IS: 1678 and IS: 2372-1974).
4. Performance test for batch type concrete mixers (IS: 4634 -1991).
5. Masonry strength (IS: 1905 -1987)
6. Shrinkage, moisture movement, density and water absorption (IS: 2185-1978 Part I and II).
7. Compressive strength of concrete blocks (5 Nos.) IS: 2185-1978 Pt. II).
8. Testing of block making machine (IS: 13219 -1992).
9. Performance test batch type concrete mixer (As per IS: 4634 -1991).
10. Performance test of concrete vibrators immersion type (As per IS: 2505 - 1992 or screed board type - as per IS: 25061-1985 or vibrating table - as per IS: 2414 -1963).
11. Testing of pre-stressed concrete poles (IS: 2905 -1989 & IS: 1678-1978 & IS: 2332 -1974).
12. Testing of sealant (IS: 12118 Part 1987).
13. Testing of paint & varnishes durability test (salt spray test; corrosion cabinet test, sea water resistance (IS: 101 Part 6, 1988).
14. Testing of plywood for general purpose IS: 303 -1987.
15. Testing of pre-constituted wood based panels materials (IS: 2380-1977).
16. Testing of cement bonded particle-boards (ISO: 8335 -1987).
17. Testing of medium density fiber-boards (I to X) (IS: 12406 -1988).
18. Testing of polymeric liquid waterproofing membrane (IS: 101, IS: 5913, IS: 7290).
19. Testing of 3 polythene sheets for tensile, elongation and permeability (IS: 2508).
20. Testing of glass fiber reinforced, tissue bitumen tar felt for water proofing & damp proof (IS: 7193).
21. Testing of fired/burnt bricks for general tolerance, compressive strength, water absorption (IS: 1017-1986).
22. Compressive strength and water absorption of bricks or tiles (IS: 1077-1986).



**Environmental Chamber**



**Scanning Electron Microscope**

23. Testing of soils for common building bricks/clay-fly ash bricks/light weight bricks production by manual process (IS: 2117-1975, IS: 137-1993).
24. Testing of soil suitability for clay tile production (IS: 2850 -1984).
25. Total water-soluble salts in bricks or soil or water sample. (IS: 3495 -1976).
26. Physical properties of acid resistant mortar (IS: 483 -1988).
27. Physical test and acid resistant test for bricks/tiles. (IS: 4860 -1968).
28. Testing of clay canal lining tiles (IS: 654 -1972, IS: 1478 -1976, IS: 3387 -1975).
29. Testing of clay roof lining tiles (IS: 1478 -1976).
30. Testing of clay flooring tiles (IS: 654 -1974).
31. Testing of terrazzo tiles for water absorption transverse strength and absorption (IS: 1237 -1959).
32. Testing of water samples to assess its suitability for construction/brick making application (IS: 456).
33. Testing of bricks for compressive strength water absorption (IS: 1077 -1986).
34. Evaluation of sensitivity in fire tests (CL=4.18 G IS: 1136).
35. Evaluation of thermal response of heat detector (HD-01) (CL 5.2 of IS: 2175-1988).
36. Fire resistance evaluation of building elements - One hour (IS: 3809, -1995, ISO: 834, BS: 476 Part 20 & 22 IS: 3614 Part 2).
37. Fire resistance evaluation of safety and security equipments (IS: 3809, -1995, ISO: 834, BS: 476 Pt. 20 & 22 IS: 3614 Part 2).
38. Testing of clay flooring tiles from a single (IS: 654 -1972).
39. Evaluation of dry chemical powder for fighting fibers in burning metals (IS: 4861 -1983).
40. Evaluation of foam compounds for producing mechanical foam (IS: 4989).
41. Testing of flame arrestors (IS: 11006 -1984).
42. Testing of flame-proof enclosures (IS: 2148 -1981).
43. Testing of sprinklers as per (IS: 1972 -1981).
44. Testing of point smoke detector (IS: 11360).
45. Testing of heat sensitive fire detector (IS: 2175).
46. Sensitivity and thermal response assessment of heat detector IS: 1275.
47. Sensitivity and fire response assessment of smoke detectors (IS: 1136).
48. Physical testing of cement/hydraulics (IS: 4031).
49. Testing of sand/marble for sieves and silt analysis (IS: 2386).
50. Analysis of water for its suitability for use in cement and concrete (IS: 456).
51. Determination of mix proportions of cement sand mortar/plaster including raw materials analysis (IS: 1199-1959).
52. Physical testing of lime (IS: 712 -1984).
53. Determination of un-hydrated magnesia of lime (IS: 6932 -1973).
54. Transverse strength of hydrated lime (IS: 6932 -1973).
55. Setting time of hydraulic lime (IS: 6932 -1984).
56. Popping and pitting test of lime (IS: 6832 -1973).
57. Testing of lime pozzolana mixtures (IS: 4098 -1983).

58. Fineness of lime (IS: 6932 -1973).
59. Available lime content (IS: 1514 -1990).
60. Workability of lime (IS: 6932 -1973).
61. Volume yield of lime (IS: 6932 -1973).
62. Compressive strength of hydraulic lime (IS: 6032 - 1973).
63. Testing of cement concrete flooring tiles (IS: 1237 -1980).
64. Testing of durability of stones (IS: 1126 -1976).
65. Quality of drinking water, natural water and waste water (IS: 24000 -1981).
66. Determination of soluble salts in soils (IS: 2720).
67. Testing of corrugated asphaltic roofing sheet (IS: 12583 - 1988).
68. Testing of bitumen mastic flooring (IS: 1195 -1978).
69. Testing of tar felt for water-proofing and damp proofing (IS: 1332 -1982).
70. Dust & Gaseous from stack (IS: 5182).
71. Determination of weathering of natural building stones (IS: 1125 -1990).
72. Determination of water absorption, apparent specific gravity and porosity of natural building stones (IS: 1124 -1990).
73. Determination of true specific gravity of natural building stones (IS: 1122 -1993).
74. Petrographic studies of rocks and soils (IS: 1123 -1975).
75. Determination of durability of natural building stones (IS: 1126 -1990).
76. To determine the water absorption of cellular concrete bricks (IS: 3590 -1966).
77. Bond strength of lime concrete (areated) (IS: 2770 Part 1).
78. Corrosion of steel re-enforcement in cellular (aerated) concrete (IS: 6441 Part 4).
79. Impact test & corrugated roofing sheet (IS: 12583).
80. Testing of quartz sand for crushing value (IS: 2386 Part 4).
81. To evaluate the physical properties of bricks and sand samples (IS: 3486, Part I & II).
82. Stock emission monitoring (IS: 5182).
83. Concrete mix design (IS: 10262 - 1982).
84. Compressive strength test of concrete cube (IS: 516 - 1956).
85. Compressive strength test of concrete cylinder (IS: 516 - 1959).
86. Flexural strength test of concrete specimens (IS: 516 - 1959).
87. Tensile test on reinforcing bars (IS: 1608 - 1972 IS: 1786 - 1985).
88. Tensile tests on welded plain & deformed steel reinforcing bars, (IS: 1608 - 1972, IS: 1786 - 1985).
89. Bond test by pull out method-three specimen (As per IS: 2770 Part - I, 1967).
90. Model testing of artificial sky for day lighting (Is: 240 - 1975).
91. Sound absorption coefficient by reservation chamber method (IS: 8225 - 1976).
92. Sound transmission loss by reverberation chamber method (IS: 9901 - 1981).
93. Thermal conductivity test (IS: 3346 -1980).
94. Sound insulation of ACC blocks composite wall (IS: 11050 Part - 1 1984).
95. Plate load test (maximum 2.0 M depth) loading intensity 40T/M (IS: 1888 - 1971 & 1982).
96. Unconsolidated undrained triaxial tests (Cat) (IS: 2710 Part - II).
97. Consolidated undrained test (triaxial) (IS: 2720 Part - 12).
98. Consolidation (constant rate of strain) test (Cat) (IS: 2720).
99. Direct shear test for rock sample (IS: 2720).
100. Direct shear test (consolidated-undrained) (IS: 2727).
101. Consolidation test (IS: 2720).
102. Large shear box (unconsolidated undrained) (IS: 2720).
103. Large shear box test (Consolidated undrained) (IS: 2720).
104. Large shear box (Consolidated-drained test) (IS: 2720).
105. Pile load test (Compression, Pullout and Lateral) (IS: 2911 - 1985).
106. Load test on footing in boulder deposits (75X75 cm, 1.0x1.0M, 1.5x1.5M; maximum loading 100 tons IS: 10108 -1982).
107. Boring (dry with auger and casing after water table) up to 10M depth (IS: 1892 - 1979).
108. Standard penetration test (10M depth) per borehole and at 1.5M interval (IS: 2131 - 1981).
109. Collection of un-distributed samples up to 10 M depth (IS: 1892-1979).

110. Collection of disturbed samples up to 10M depth (IS: 1892 - 1979).
111. Dynamic cone penetration (DCPT) up to 10M depth or refusal (IS: 4968 - 1976).
112. Static cone penetration test (SCPT) up to 10M depth or capacity of machine 5 ton (IS: 4968 – 1976).
113. Field shear test (BBT, CBT percentage fines) in-situ density (IS: 10108 -1932).
114. Permeability test (IS: 2720).
115. Direct shear test (un-consolidated-undrained) (IS: 12634 - 1989).
116. Point load test (four specimen) (IS: 8764 -1478).
117. Moisture content (IS: 2720).
118. Atterberg limit (IS: 2720).
119. Specific gravity (IS: 2720).
120. Mechanical grain size analysis (IS: 2720, IS: 1498).
121. Wet grain size analysis (hydrometer analysis) including test (IS: 2720).
122. Differential free swelling test (IS: 2720).
123. Unconsolidated free swelling test (IS: 2720)
124. Consolidated drained triaxial test (IS: 2720).

## Training Facilities

CBRI offers training programmes to engineers, architects, artisans, contractors and administrators in different areas of building science and technologies. A number of overseas personnel from Sri Lanka, Vietnam, Philippines, Bangladesh and Bhutan have visited CBRI for trainings. Training programmes organized by CBRI in the recent past are;

- AutoCAD
- GIS
- Waterproofing of Buildings
- Low cost construction technologies for hilly regions
- CBRI Pre-cast building component technology
- Repairs and strengthening of earthquake affected houses
- Active and Passive fire protection systems
- Low Cost Building Materials & Technologies
- Rural housing and sanitation
- Brick Production Technologies

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 **STE Desk**

**Note:** The author may have used various references in the preparation of this article. For further details please contact him/her.

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