

CIVIL ENGINEERING

Shri Ramdeobaba College of Engineering and Management (RCOEM), situated in the heart of India in Nagpur city, was established in 1984 by Shri Ramdeobaba Sarvajanik Samiti, a trust which has been involved in community service for over four decades. 34 years of existence has helped RCOEM grow deep roots and establish a strong foundation in technical education. Journey of a student in this institute has always involved comprehensive knowledge building from practical skills, theoretical knowledge to personality development, which has given them a head-start in their career.

RCOEM was granted academic autonomy from the session 2011-12. Various statutory bodies such as Board of Management, Academic Council, Board of Studies, and Finance Committee have already been constituted and an industry need-based syllabus has been introduced.

The Department of Civil Engineering is one of the first departments established in the college and is continuously delivering talented civil engineers to the society. The results in the examinations conducted by University are excellent and a number of meritorious students from this very department find themselves in the RTMNU merit list.

Currently the department is headed by Dr. P.D. Pachpor who has 32 years of teaching experience. He completed his post graduation in the field of Structural Engineering and obtained doctorate degree in the same field. The department has 11 Ph.D and 16 M.Tech. faculties with different specializations.

The Department is an approved research centre of RTM Nagpur University for M. E. by Research & Ph.D. Programmes.

The Department also runs two post graduate programmes namely M. Tech. (Structural Engineering) Full-Time and M. Tech. (Geotechnical Engineering) Part-Time. The UG program is accredited four times and the PG program M. Tech. (Structural Engineering) is accredited thrice by NBA, New Delhi.

The department is proud of its alumni who are working in prestigious organizations such as PWD, CPWD, IRCON, RITES, AFCONS, etc. Many of the alumni are successful entrepreneurs in the field of Civil Engineering.

The faculty has successfully completed many consultancy assignments for organizations such as BPCL, WCL, MOIL, Ispat Industries, J.K. Paper mills, etc. Civil Engineering Department offered consultancy to Vidarbha Irrigation Development Corporation for stabilization of right bank canal of Gosikhurd Irrigation Project. The Civil Engineering department has also successfully completed testing assignments worth more than Rs. 15 Lacs for organizations such as Indian Railways, BPCL, CPWD, MOIL, MSPHS, CMRI, ARTIFACT PROJECTS, etc.

The Department has spacious well equipped state of the art laboratories with instruments of more than Rs. 1 Crore to cater to the needs of undergraduate / post graduate programmes.

As per the trend every year the final year students in the department come out with flying colours. The result for the final year ranges from 95 to 100%. More than 50% of the students passing Final Year secured job in various Govt. Organizations like P.W.D., M.E.S., Irrigation Department and various construction firms like ACC, Gammon India, IVRCL, AFCONS etc. More than 40% of the students went for higher studies in structures, environmental engineering and construction technology and management at various institutes like Visweswaraya National Institute of Technology, Nagpur (V.N.I.T.), NICMAR, V.J.T.I, Mumbai and C.O.E.P., Pune.

Department is actively associated with research institutes like NEERI (National Environmental Engineering Research Institute) and professional bodies like, IWWA (Indian Water Works Association), ICI (Indian Concrete Institute), GES (Geotechnical Engineering Society).

Regular interaction of the faculty with National Institutes like NITs, IITs is carried out for the effective development of laboratories. Workshops, guest lectures on GIS & Remote Sensing, Advances in Construction Technology, STTPs based on Civil engineering Softwares like STAAD, SAP, ANSYS, Auto CAD are organized to acquaint students with the recent advances in the field of Civil Engineering.

The Department is providing testing and consultancy services in the field of Geotechnical Engineering, Environmental / Waste water Engineering, Concrete Technology, Transportation Engineering, Strength of materials and Estimation and Surveying work.

ENVIRONMENTAL / WASTE WATER ENGINEERING

A. TESTS ON WATER SAMPLES

Sr.No.	Tests
1	PH Determination
2	P & M Alkalinity
3	Total Hardness
4	Magnesium
5	Calcium
6	Chlorides
7	Sulphates
8	Turbidity
9	Sodium
10	Potassium
11	Iron



- 12 Manganese
- 13 Nitrate
- 14 Phosphates
- 15 Standard Plate Count Test
- 16 MPN. Bacteriological
- 17 Conductivity

B. TESTS ON WASTE WATER SAMPLES

- 18 PH Determination
- 19 P & M Alkalinity
- 20 Total Hardness
- 21 Chlorides
- 22 Sulphates
- 23 Sulphides
- 24 Nitrogen
- 25 Phosphorous
- 26 Total Solids
- 27 Suspended Solids
- 28 Volatile Solids
- 29 Dissolved Oxygen (D.O.)
- 30 Chemical Oxygen Demand (C.O.D.)
- 31 Biochemical Oxygen Demand (B.O.D. 5 days)



C. TESTS ON WATER SAMPLES FOR CONSTRUCTION

- 32 PH Determination
- 33 Total Solids
- 34 Suspended Solids
- 35 Organic & Inorganic Solids
- 36 Acidity
- 37 Alkalinity
- 38 Chlorides
- 39 Sulphates

D. ANALYSIS OF FILTER MEDIA

- 40 Effective Size & Non-Uniformity coefficient
- 41 Wearing loss
- 42 Loss on Ignition
- 43 Soluble Fraction
- 44 Specific Gravity
- 45 Durability of Sand
- 46 Silica content of sand

E. AIR QUALITY MONITORING

- 47 Determination of SPM

- 48 Determination of SO₂
- 49 Determination of NO₂
- 50 Determination of Co

F. ENVIRONMENTAL IMPACT ASSESSMENT

- 51,52 Design, Construction, Commissioning, Operation & Maintenance of water and waste water treatment plant.

CONCRETE TECHNOLOGY

Special feature of lab : Micro processor based compression testing machine (2000kN)

A. TESTS ON CEMENT

- 53 Normal Consistency of Cement
- 54 Fineness by Sieving
- 55 Fineness by Blaines Apparatus
- 56 Initial and Final Setting time
- 57 Compressive Strength of Cement (3 Specimens)
- 58 Soundness of Cement

B. TESTS ON AGGREGATE (COARSE)

- 59 Specific Gravity and water absorption
- 60 Sieve analysis
- 61 Flakiness Index Test
- 62 Elongation Index Test
- 63 Crushing value



C. TESTS ON AGGREGATE (FINE)

- 64 Specific Gravity and water absorption
- 65 Sieve analysis
- 66 Sieve analysis with particle size graph
- 67 Bulking of sand
- 68 Bulking of sand with graph
- 69 Silt content
- 70 Organic Impurities in sand



D. TESTS ON BRICKS

- 71 Crushing Strength
- 72 Moisture content
- 73 Water absorption
- 74 Efflorescence test
- 75 Dimension test

E. TESTS ON CONCRETE

- 76 Crushing strength of concrete
Size 15 X 15 X 15cm Cube Test
Cylinder Test
- 77 Modulus of Elasticity of concrete
- 78 Crushing strength of concrete solid/hollow block
- 79 Water absorption of concrete
- 80 Density of concrete hollow block
- 81 Flexural strength test on concrete beam
size 10 X 10 X 50 cm
size 15 X 15 X 70 cm



F. CONCRETE MIX DESIGN

- 82 M20 Grade
- 83 M30 Grade
- 84 M40 Grade
- 85 M45 Grade

G. NDT ON CONCRETE

- 86 Rebound hammer test /ultrasonic pulse velocity test.

TRANSPORTATION ENGINEERING

Special feature of lab: Benkelman beam test to find thickness of overlays

- 87 Sub grade Soil: CBR test
- 88,89 Aggregates: shape test.(Elongation Index, Flakiness index and Soundness test)
- 90 Aggregates: Los Angeles abrasion value test.
- 91 Aggregates: impact test.
- 92 Aggregates: crushing value test.
- 93 Aggregates: Specific Gravity
- 94 Aggregates: Water absorption test
- 95 Aggregates: Silt Content
- 96 Bitumen: Penetration Value.
- 97 Bitumen: Ductility Test.
- 98 Bitumen: Softening point test.
- 99 Bitumen: Flash and Fire point test.
- 100 Bitumen: Specific gravity.
- 101 Bitumen: Adhesion Test.
- 102 Bitumen: Extraction test (% of bitumen)



STRENGTH OF MATERIALS

Special feature of lab : Digital Universal Testing machine(UTM)

- 103 Tension test on-for steel bars upto 20mm
- 104 Tension test on TOR steel bars upto 20mm
- 105 Tension test on M.S. steel bars 6mm
- 106 Torsion test on mild steel upto 20mm
- 107 Impact test on metals.(charpy and Izod test)
- 108 Bending test on beams (upto 1m length)
- 109 Bending test on beams (upto 1m length) stresses and deflection

A. TEST ON GLAZED / FLOOR/ MANGALORE TILES

- 110 Water absorption
- 111 Impact resistance
- 112 Resistance to Wear

- 113 Water absorption (**MANGALORE**)
- 114 Flexural strength



B. TESTS ON STONES

- 115 Water absorption and Specific Gravity
- 116 Crushing strength
- 117 Impact value

C. TESTS ON TIMBER

- 118 Moisture content of timber
- 119 Water absorption
- 120 Compressive strength (i) Perpendicular to grain
(ii) Parallel to grain

GEOTECHNICAL ENGINEERING

Special feature of lab: Bearing capacity of soil by pressure meter

A. INDEX PROPERTY TESTS

- 121 Dry sieve analysis
- 122 Wet sieve analysis
- 123 Sedimentation analysis (Pipette/Hydrometer)
- 124 Liquid Limit and Plastic Limit
- 125 Shrinkage Limit
- 126 Specific gravity of :
 - a) Coarse grained soil
 - b) Fine grained soil
- 127 Moisture content (Oven method)
- 128 Complete Soil Classification
 - (a) Coarse grained soil
 - (b) Fine grained soil



129 Max. and Min. density of sand.

B. COMPACTION AND CONSOLIDATION TESTS

130 Standard Proctor Compaction Test

131 Modified Compaction Test

132 Consolidation Test :

- a) a_v , m_v , and c_c
- b) C_v (average of 3 loading stages)

C. SHEAR STRENGTH TEST

133 UCS Test

134 Direct Shear Test :

- a) Quick test (UU)
- b) Slow test (CD)

135 Triaxial test

- c) UU
- d) CU
- e) CD



D. PERMEABILITY TEST

136 Constant head test

137 Variable head test

E. TESTS ON SWELLING SOIL (BCS) :

138 Free Swell index test

139 Swelling pressure test

(II) FIELD TESTS :

140 Field classification tests (Per spot)

141 Bulk density

- (a) Sand replacement test
- (b) Core cutter test

142 Undisturbed soil sampling

143 Disturbed soil sampling

144 Swelling pressure test (by portable kit)

145 Plate Load Test (Plate size 30 X 30 cm)

(Only test conduction and preparation of results)

146 Standard Penetration Test :--Upto 3m

-- 3m to 5m

147 Static Cone Penetration Test

(Soft clayey soil, upto 3m)

148 Menard Pressuremeter Test (conduction of test, inter-pretation)

& bearing capacity determination).

--upto 3m

--upto 3m to 5m

--upto 5m to 8m

SURVEYING AND ESTIMATION WORK

Special feature of lab :Surveying by Total Station,1 second optical theodolite, auto levels and area calculation by using Digital Planimeter

- 149 Earthwork calculations.
- 150 Topographical map.
- 151 Contour maps.
- 152 Area measurement and locating boundaries.
- 153 Levelling, profile and cross-sectioning.
- 154 Theodolite traversing.
- 155 Plane table traversing.
- 156 Quantity survey of structures.



Laboratory Incharge /Contact Person:

- 1) Prof. E.M.Gonnade /Prof.P.B.Kulkarni -Environmental Engineering
- 2) Prof. V.J. Rajurkar - Geotechnical engineering
- 3) Prof. V.A. Dakwale/Prof.S.S.Geete - Concrete Technology and Building materials
- 4) Prof. M.S.Tiwari / Prof. T.K.Rao - Surveying
- 5) Prof. S.V. Joshi - Estimation and Valuation
- 6) Prof. A.K. Sharma - Transportation Engineering
- 7) Prof. P.D.Hiwase /Prof.V.R.Harne - Strength of material & Structural Analysis

Department Of Civil Engineering

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