Civil Engineering - List of Laboratories/Workshops and Equipment

Types of Laboratories

Chemistry and Reaction laboratory.
Unit Operations laboratories – at least 3.
Instrumentation laboratory.
Thermodynamics and Heat transfer laboratory.

Structural Engineering

1. Civil Engineering Materials Laboratory
2. Structures Laboratory:
   - Routine testing .
   - Models and prototype testing.
   - Studio/design office.

Geotechnical Engineering

Field soil survey and testing (including sub-soil investigation and drilling) Laboratory soil/rock testing.

Geodetic Engineering and Photogrammetry

1. Laboratory equipment stores.
2. Photogrammetry and Remote sensing Laboratory.

Water Resources and Environmental Engineering

1. Hydraulics Laboratory.
2. Hydrology Laboratory.
3. Environmental Health Laboratory.

Highway and Transportation Engineering

1. Highway Materials Testing Laboratory.
2. Pavement Laboratory.

Major Equipment

Structural Engineering Laboratory

1. Universal Testing Machine with accessories for tension, compression.

2. transverse 180o cold bend, double shear, punching and brunel hardness tests. Capacity – 10000KN; Transverse beam – 500KN.

3. Proto-type tests facilities for testing of proto-type in structural elements, i.e. beams, frames, trusses, etc. Accessories for the purpose include 1000KN, 250KN load rings, electronic load cells, faculty workshop facilities, DEMEC High accuracy gauges, hydraulic jacks, etc.

4. Compression testing machine and transverse flexural testing frame: suitable for standard compression, flexural tensile tests and split cylinder tests on standard concrete and wood specimens to BS 1881 and CP 112 respectively. Shear rig can be manufactured and attached to this machine for testing shear strength of wood and glued wood joints. Capacity of the machine is 2500KN.

5. Routine testing and demonstration equipment: This includes armfield extensometres, arch frames, suspension bridge frame and pin-jointed frame work.

6. Concrete batching and making equipment:
Multi-flow mixers, 112 Dm3 (4ft3) and 56 Dm3 (2ft3) capacities 200-240V.
Test BS sieves of various sizes.
Semi-automatic scale 25kg capacity.
Automatic scale 500kg capacity.
Standard moulds of various sizes and tamping rods.
Vibrating table.

7. Concrete quality and workability equipment:
Slump cone apparatus to BS 1881 ASTM CI43.
Compacting factor apparatus to BS 1881 (2 sizes).
Vibro Consistometre to BS 1881.
Vicat apparatus.
Air entrainment metre.

Water Resources and Environmental Engineering Laboratory

1. Laminar/turbulent pipe flow apparatus
2. Radial flow pump
3. Radial flow turbine
4. Surges in pipes apparatus
5. Surge tower
6. Water hammer apparatus
    a. Evaporating dish
7. Steam bath or infrared lamp
8. Drying oven
9. Desiccator
10. Analytical balance
11. Reagents – Sodium hydroxide, in distilled
12. Water, phosphate buffer solution, magnesium.

13. Sulphate solution, calcium chloride solution, ferric chloride solution, acid and alkali solution, etc.

14. Laboratory flow channel
15. Fibre glass
16. Thermometres
17. Funnels
18. Test Tubes

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Geotechnical Engineering/Highway and Transportation Engineering Laboratory:

1. Tri-axial testing machine complete with transducers cells and accessories.

2. Motorized direct/residual shear box machine complete with load rings, set of weights and accessories.

3. CBR Testing machine complete with moulds, load ring gauges and accessories.

4. Consolidation apparatus complete with cells, gauges and set of weights.

5. Laboratory vane test apparatus complete with set of springs and motorizing attachment.

6. Large capacity floor-mounting electric ovens 40oC to 16oC.

7. Hotplates with Simmersat heat control unit 220–240V, 2000W.

8. Mettler top-loading balance with optical scale 100 g, Readability 0.01 g, capacity1.3 kg.
9. Graduated twine beam scale complete with two stainless steel pans 0 to 200 g x10g.

10. Semi-automatic balances, 25kg capacity complete with scoope and set of counter weights.

11. Autographic unconfined compression apparatus complete with platens springs.

12. Unconfined compression apparatus complete with platens and strain gauge mounting assembly and dial gauge.

13. Automatic sieve shaker for up to 200 mm diametre sieve.

14. BS sieves 212 mm to 8 mm and 200mm diametres.

15. Simple hand boring sampling augers complete with accessories.

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16. Portable drilling unit with two-stroke petrol engine and two pairs of handles complete with extension rods.

17. Atterberg limits determination apparatus complete with liquid limit device and accessories.

18. High-speed stirrer complete with cup and baffler.

19. Constant temperature bath complete with hydrometre jars, watt heater, thermostat, etc.

20. CBR Marshall tester complete with breaking head stability mould and flow metre dial gauge.

21. Compaction pedestal complete with hammer and mould body.

22. Constant head permeability apparatus complete with cells and accessories.

23. Standard proctor compaction mould, 1000 cm3 capacity complete with rammers and accessories.

24. GEONOR swelling test apparatus complete with cells and accessories.

25. Riffle boxes complete with three rigid metal containers.

26. Wax melting pot with thermostatic control up to 150oC range.

27. Hand-operated extruder – screw type sample extruder for 38mm dia. Complete with built-in sample tube supports.

28. Proctor/core cutter extruder comprising a frame and a 15-KN hydraulic jack.

29. Universal extruder comprising a frame and a 15-KN hydraulic jack.

30. Bench-moulding mixer with three-speed gear box complete with stainless steel bowl 7.5 dm3 capacity.

31. Long stem soil hydrometre graduated 0.995 to 1.030 g/ml.

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32. Sieving extractor complete with clamps and clamming ring for use with sieves of 200mm dia.

33. Minor centrifuge complete with 8-place angle head, 8 x 50 ml metal buckets and caps.

34. Ductilometre for testing 4 specimens complete with briquette moulds and base plate.

35. Flash and fire-points apparatus gas heated.

Geodetic Engineering and Photogrammetry Laboratory:

1. Theodolites
2. Levels
3. Compasses
4. Umbrellas
5. Protractors
6. Steel tapes
7. Engineer's chains
8. Ranging rods
9. Surveyor's scales
10. Theodolites
11. Levels
12. Compasses
13. Umbrellas
14. Protractors
15. Steel tapes
16. Engineer's chains
17. Ranging rods
18. Surveyor's scales
    a. Various graph paper
    b. French curves
    c. Log tables
19. Planimetres
20. Plumbulbs

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21. Arrows
22. Field books
23. Modern survey equipment as affordable e.g. Total Station, Global Positioning System (GPS), Terrestrial Laser Scanner (TLS).

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