DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)
Govt. of NCT of Delhi, Bawana Road, Delhi- 110042

Department of Civil Engineering

SNO	Name of Laboratory	Lab In-Charge	Technical staff	Attendant
1	CAD lab	Dr Awadhesh Kumar	Sh Anil Agnihotri	Mr Pankaj Kumar
2	Earthquake Technology Lab	Dr Shilpa Pal	Sh Shashikant	Mr Sanjay
3	Soil Mechanics Lab	Prof A K Gupta (Geotech)	Sh Sunil Tirkey	Mr Atul Kumar Sharma
4	Foundation Engineering Lab	Prof A Trivedi	Sh Sunil Tirkey	Mr Atul
5	Rock Mechanic Lab	Prof Amit Shrivastava	Sh Shashikant	Mr Rakesh
6	Fluid Mechanics	Dr Munendra Kumar	Sh Anil Agnihotri	Mr Nitesh Kumar
7	Hydraulics, Mechanic Lab	Dr S Anbu	Sh Anil Agnihotri	Mr Nitesh Kumar
8	Transportation Engineering	Sh Susheel Kumar	...	Mr Sonu
9	Geology Engineering Lab	Sh Kongan Aryan	...	Mr Inder
10	Structures Lab	Sh G P Awadhiya	Sh Sunil Tirkey	Mr Manoj
11	Survey Lab	Dr T Vijaya Kumar	Sh .Shashikant	Mr Inder Singh
12	Strength of Materials Lab	Sh Narad Muni Prasad		Mr Sanjay
13	Concrete Lab	Prof Alok Verma	Sh Shashikant	Mr Rakesh
14	Mechanics of Solid Lab	Dr P K Goyal	Sh Shashikant	Mr Sanjay
15	Geo-Mechanics Lab	Prof A Trivedi	...	Mr Atul
16	Engineering Mechanics Lab	Dr Ritu Raj	Sh Shashikant	Mr Rakesh

Prof Vijay K Minocha
Head (Civil)

Laboratories and Research Facilities

The Department has well-equipped laboratories and research facilities in Civil Engineering Department as follows:

Earthquake technology Laboratory:

Basic issues related to vibration behavior, such as, damping, dynamic response magnification, resonance, structural vibration under support motions, normal modes, vibration isolation, vibration absorption, dynamics with soft and/or weak first/intermediate stories, role of structural ductility in resisting dynamic loads, liquefaction of soils under dynamic loads, and rocking and up throw of rigid objects under dynamic base motions. These setups would provide valuable physical insights into the basic vibration behavior of structures in general, and structural dynamic responses under base motions in particular. Experiments which are performed and demonstrated inEarthquake Technology laboratory / Structural Dynamics laboratory are as follows:

- Dynamics of a three storied building frame subjected to harmonic base motion.
- Dynamics of a one-storied building frame with planar asymmetry subjected to harmonic base motions.
- Dynamics of a three storied building frame subjected to periodic (non-harmonic) base motion.
- Vibration isolation of a secondary system.
- Dynamics of a vibration absorber.
- Dynamics of a four storied building frame with and without an open ground floor
- Dynamics of one-span and two-span beams.
- Earthquake induced waves in rectangular water tanks
- Dynamics of free-standing rigid bodies under base motions
- Liquefaction problem.
- Seismic wave amplification studies and soil structure interaction
- Earthquake induced waves in rectangular water tank.

Some of the instruments of this lab are,

Vibration Isolation model,

Liquefaction model.

Three storey frame- shear building model.

Four storey frame with stiffeners- soft storey model.

One storey frame with stiffeners.

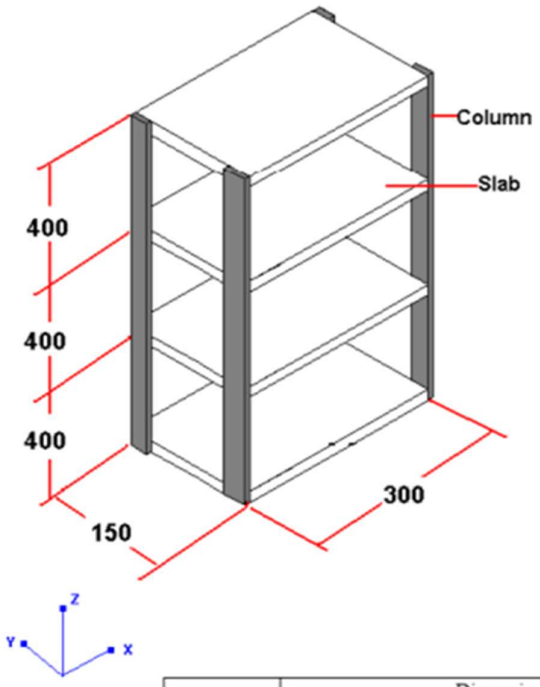
Four storey frame- weak storey.

Horizontal shake table with cylindrical cam.

Vertical shake table.

Vibration analyzer with suitable accessories.

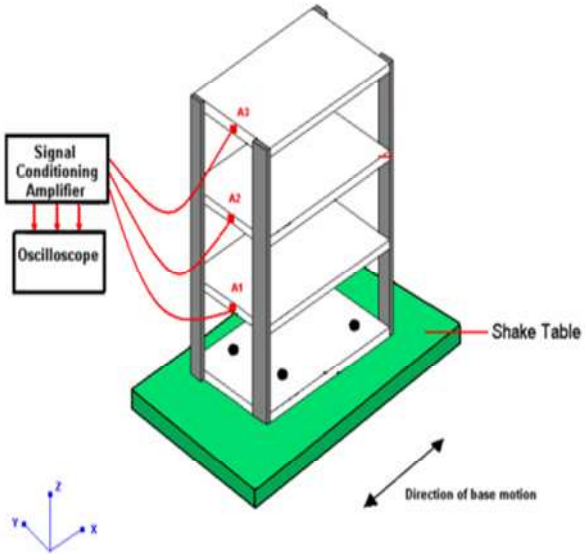
1. Data acquisition system for strain measurement.



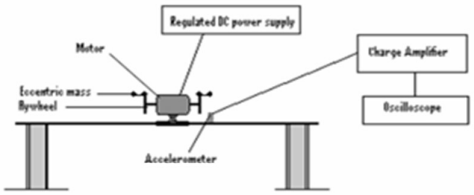
Part	Dimensions in mm		
	Depth (D)	Width (B)	Length (L)
Column	D_A =3.00	B_A =25.11	L_A = **400.00**
Slab	D_B =12.70	B_B =150.00	L_B =300.00

Three-story shear building model used in experiment

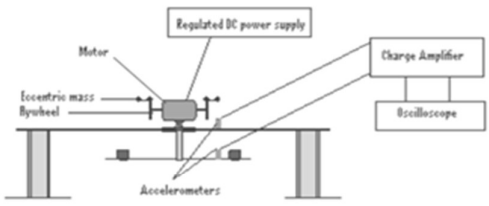
2. Accelerometers.



Experimental setup for three-storey shear building frame



Setup for studies on primary beam (without absorber beam)



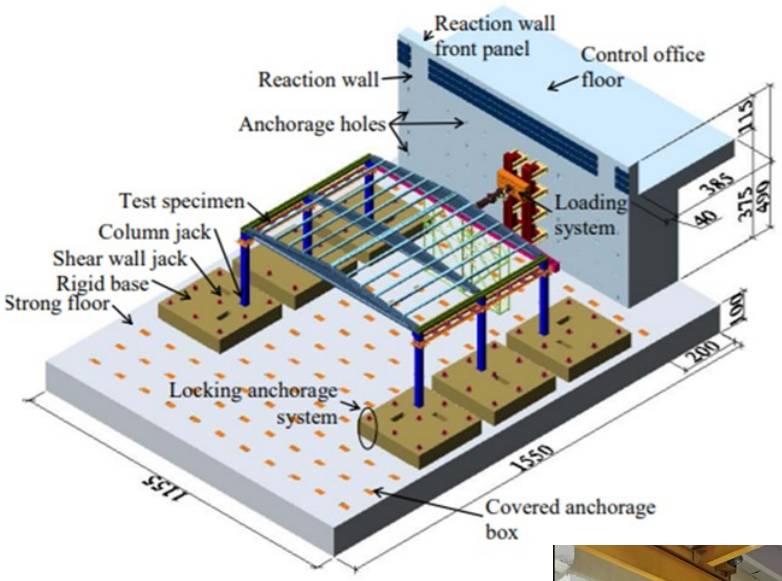
Setup for studies on combined system of primary beam and absorber beam

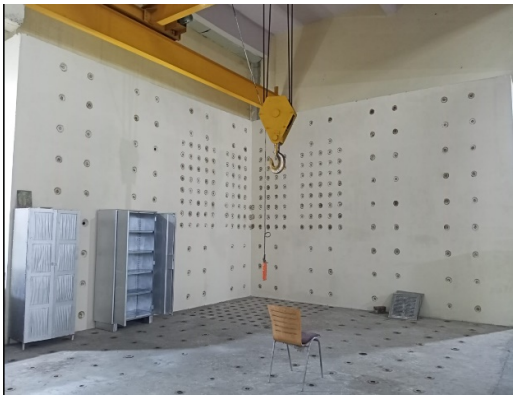
Strong Floor and L shape Reaction wall

The Reaction Wall and Strong floor make it possible to test multiple full-scale structural experiments. The wall can be used to perform seismic tests by using experimental methods, such as traditional quasi-static tests, cyclic loading tests and pseudo-dynamic tests.

The reaction wall is L-shaped and has dimensions: 6 m x 4.5 m, 6m x 4.5 m. The strong floor is a reinforced block of concrete 12 m x 6 m x 0.75 m. The compressive strength of the concrete for both the reaction wall and the strong floor is 350 kg/cm^2

During experiments, full-scale and large-scale constructions are mounted onto the strong floor. Hydraulic actuators then exert forces on the test objects, making it possible to see the resistance of various structures and performances of seismic isolators and energy dissipaters. The experimental data has helped proved that seismic theories can be applied and are a reference to earthquake resistant building designs.





View of the L shape Reaction Wall next to strong floor

View of the Strong

UTM

CADD Laboratory:

Around 20 desktop computers are available in the laboratory. The list of software which are available in the CADD lab are as follows:

- GT STRUDL
- STAAD software
- STRAP software
- Geo Media Fundamental
- LARSA software
- MAT LAB
- NISA
- Geo Media pack
- ERDS Imaging
- ANSYS software
- PLAXIS
- Geo STUDIO professional

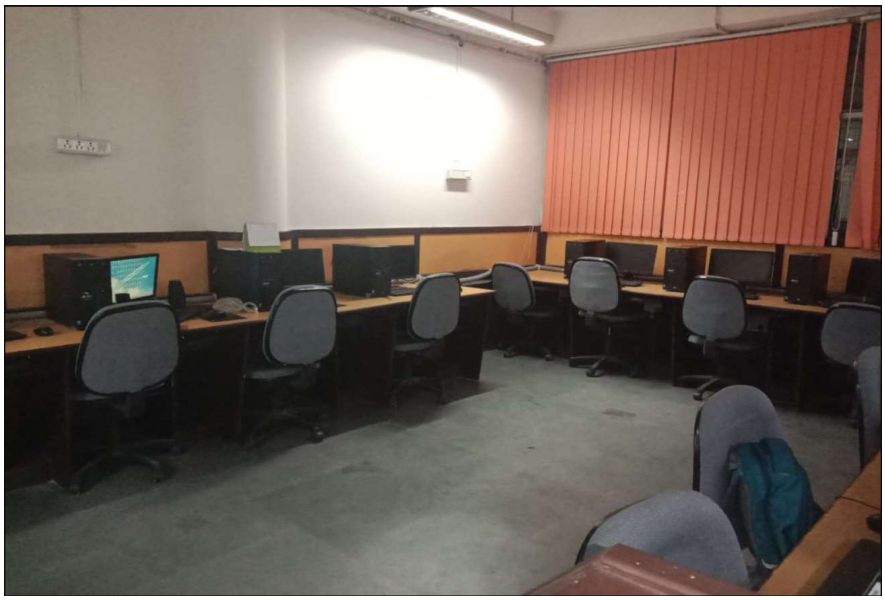
Experiments using NISA and ANSYS: in FEM CE 503 course

- Study of NISA , create models, pre and post processing
- Study of NISA , create models, Beam, Space Frame problems
- Application of NISA , CAD based modeling, slab problems
- Application of NISA , plane stress problems, Shear wall problems
- Application of NISA , plane strain problems, 2D gravity dam problems
- Application of NISA , plane strain problems, , Retaining wall problems

- Application of NISA , Gravity dam problems, Spillways problem
- Application of NISA , Earthen dam problems
- Application of NISA , Bridge problems
- Application of NISA , Water Tank (Circular) problem

ANSYS software study

- Creating Chimney model in ANSYS
- Creating wind envelope model for chimney problem
- Computational flow dynamics study for chimney problem
- Plotting of wind pressure on windward and leeward side of the chimney and other structural responses
- Nonlinear analysis problems



Geo-Informatics and GIS as Centre of Excellence:

- For assessing risks and hazards and identifying potential emergencies and disasters.
- Appropriate prevention or mitigation strategies developed thus can reduce the impact of potential emergencies.
- Large, complex emergencies such as earthquakes often affect multiple departments or multiple agencies and require data to be collected and assembled from a variety of locations quickly under adverse conditions.
- GIS helps to manage the impact of earthquakes and other disasters by Assessing risk and hazard locations in relation to populations, property, and natural resources.

- Integrating data and enabling understanding of the scope of an emergency to manage an incident Recommending preventive and mitigating solutions
- This facility is a unique facility and offers backend support to the MTech Structural Engineering students and the PhD students.
- From earthquake engineering perspective the ArcGIS provides a very good data regarding shear wave velocity.
- For building damage estimation modelling post-earthquake scenario.

Soil Mechanics lab:

This laboratory is equipped with all necessary equipment for undergraduate and postgraduate teaching and research in soil mechancis. Research, consultancy and regular soil testing works are conducted in this laboratory under the supervision of faculty members, research scholars and laboratory staffs specializing in the area of Geotechnical Engineering.

Foundation Engineering lab:

The soil mechanics and foundation engineering laboratory is equipped with the latest apparatus for testing of soils at UG, PG and research level. Apart from the laboratory testing by the students/ scholars, the lab is used for consultancy to outside organizations. The loads from any structure must be ultimately transmitted to a soil through the foundation for the structure. Thus, the foundation is an important part of a structure, the type and details of which can be decided upon only with the knowledge and application of the principles of soil mechanics

Rock Mechanic lab:

This laboratory is equipped with all necessary equipment to determine shear strength, the compressive strength of soil sample, cohesion and angle of shearing resistance for c-ϕ soil, uniaxial compressive strength, tensile strength, indirect tensile strength of rock core specimen.

Fluid Mechanics lab:

The objective of the Fluid Mechanics and Hydraulics lab is to enrich the concept of fluid mechanics and hydraulic machines to the undergraduate as well as post graduate students. This lab helps to correlate various flow measuring devices such as Venturi meter, orifice meter, notches, turbines, pumps, and open channel flowing concepts etc. The list of Experiments is given below.

- Francis Turbine Test apparatus
- Kaplan Turbine Test apparatus
- Mini Hydraulic Flume,
- Centrifugal Pump
- Pelton Wheel Turbine
- Open Channel Flow Equipment,
- Hydraulic Models
- Impact of Jet Apparatus
- 10 meters Open Channel Flume, with all modern accessories like electro-magnetic flow meter, ultrasonic sensor for measuring the head

- 16 Mhz ADV Probe,Water velocity meter,Canal Bed Profiling System.
- Metacentric height apparatus,
- Orifice & mouthpiece apparatus
- Orifice meter apparatus,
- Pipe friction apparatus
- Venturi meter apparatus
- V-notch apparatus
- Forced vortex apparatus
- Free vortex apparatus
- Bulb loading arrangement with stand

Hydraulic, Mechanic Lab:

This state-of-the art facility is used to conduct a variety of experiments pertaining to water. This laboratory provides a means of testing the hydraulic properties of submerged bridges and the hydraulic properties of highway drainage structures and stream crossings.

Transportation Engineering:

The Transportation Engineering lab has equipment required to conduct all standardized tests to assess quality of highway materials, pavement evaluation and traffic engineering studies. Experiments are conducted in pre-, during- and post-construction phases of highways. The Transportation Engineering lab does quality assurance and quality control tests for the Roads, Traffic engineering surveys are also conducted in the lab and students learn to conduct spot speed studies, volume counts, and conflict studies for preparing road improvement plans to enhance road safety. The lab is used for collaborative research in traffic engineering and transport planning.

Geology Engineering Lab:

The identification of different types of rocks and understanding their behavior are the major objectives of geology. Further, development of cracks, fissures in rocks, their causes and their remedies are to be learnt in this lab. The list of experiments are

- Study of Physical properties of minerals
- Identification of rocks forming silicate and ore minerals
- Recognition of rocks
- Use of clinometers compass and Burton compass for measurement dip and strike of formations.
- Geological cross sections and study of geological maps.
- Study of models of geological structures and out crops patterns of different types of rocks and land forms

Structure lab:

The primary activities include experimental studies on model/prototype of structural elements and assemblies under various static and dynamic loading conditions. the laboratory represents a unique facility for large and full scale investigation of the load-deformation behavior of structures including their post-peak strength and deformability up to the failure.

Strength of Material lab:

The objective of the strength of materials lab is to demonstrate the basic principles in the area of strength and mechanics of materials and structural analysis to the undergraduate students through a series of experiments. The following are the list of equipment.

Engineering Mechanics Lab:

The main activity of the laboratory for geo-mechanics is testing the physical and mechanical characteristics of the soil and rocks, determine the reactions at the support of simply supported beam and the coefficient of friction of different surfaces at different angles using inclined plane set up and coil friction setup.

Advanced Concrete Technology laboratory

It is a well-equipped laboratory which serves the need of M. Tech. Structural Engineering students and the PhD students for concrete technology need based requirements.

A lot of students have worked fiber reinforced concrete, polymer modified concrete through this platform. Some of the experiments covered in Durability course are as follows:

- Permeability test of Concrete
- Sorptivity test of Concrete
- Rapid Chloride permeability test of Concrete
- Bulk and surface electrical resistivity test of Concrete
- Mercury intrusion porosimetry test
- Nondestructive test of concrete

List of instruments is as under

S.No.	NOMENCLATURE	CONSIGNER
1	Vibrating table	
2	Platform balance-300kg capacity	Engg. Store
3	Crack measuring instrument	Engg. store
4	Slump Test App.	Engg. Store
5	Core Case	Engg. Store
6	Penetrometer	Lakshya Enterprises
7	Compaction factor test Apparatus	Seven Meter
8	Concrete test hammer	Lakshya Enterprises
9	ACTM 5000 KN with Computer	AIMIL Ltd.
10	Core drilling Machine	Sai Enterprises
11	Capping Set	Sai enterprise
12	Demountable strain gauge	Sai enterprise

13	Sample cutting machine	Kamakhya traders
14	Infrared moisture meter	Kamakhya traders
15	Flexure Testing m/c electrically operated	Lakshya Enterprises
16	Tile Abrasion testing machine	Lakshya Enterprises
17	Vibration Table	Lakshya Enterprises
18	Natural Frequency Tester	Lakshya Enterprises
19	Jack Hydraulic 100Kn and 50Kn	V.S. Enterprises
20	Hydraulic jack	Engg. Store
21	Permeability Apparatus	Sachdeva sales corporation
22	DIGI Schmidt hammer (ND),	Lakshya Enterprises
23	Optical accessories (test anvil)	
24	UPVT Digital type	Lakshya Enterprises
25	Resistivity meter	Lakshya Enterprises
26	Corrosion analysis Instrument	Lakshya Enterprises
27	Strong motion Acceleration	Lakshya Enterprises
28	Flexure Testing machine and Cement autoclave	HI-Tech
29	Consistometer	Sai enterprises
30	Demountable strain gauge	Sai enterprise
31	Shrinkage bar mould	Sai enterprise
32	Electric oven	Delhi Consumers pvt. Ltd.
33	Jolting Apparatus	Sai enterprise
34	Pulverizer	Sai enterprise
35	Muffle furnace	Sai enterprise
36	Length Comparator Digital	Kamakhya Traders
37	Vibration m/c for mortar cubes	Kamakhya Traders
38	GTSTRUDL Software- Basic	Cash Purchase
39	STAAD Software & manuals	Sachdeva sales corporation
40	STRAP Software	Lakshya Enterprises
41	Geomatics Fundamental V9.1	PCI Software

42	Tile flexure Testing machine	Sai enterprise
43	Aggregate Impact apparatus	testing
44	Air Permeability Apparatus	Engg. stores
45	Blone's air permeability app.	Engg. stores
46	Beam testing machine	Engg. stores
47	Compaction factor App	Engg. stores
48	Cylinder Copper	Engg. stores
49	Cement autoclave	Engg. stores
50	Cement bleeding App	Engg. stores
51	Compression Testing	Engg. stores
52	Machine(200 Ton)& 3000 kg	
53	Enkay843(Through DGSD)	Engg. stores
54	C-clamps(Heavy Duty)	AIMIL
55	Compression meter	Engg. stores
56	Flow table	Engg. stores
57	Fatigue testing machine	Engg. stores
58	Grifford Jack(Pre-Stressing)	Engg. stores
59	Gilmore Needle App	Engg. stores
60	Remote control Hydraulic Jack	Engg. sotres
61	Hydraulic hand operated Portable crane	Engg. stores
62	Concrete Mixer	Engg. stores
63	Shrinkage mould	Engg. stores
64	Mechanical Extensometer	Engg. stores
65	Tensile Testing machine	Engg. stores
66	Transducer for ultrasonic machine	Engg. stores
67	Spectralase He-Ne LASER,	Engg. stores
68	Model-500(5MW output)	
69	Ultrasonic test instrument	Engg. Store
70	Universal testing machine	Engg. Store
71	Ultrasonic concrete Tester	Engg. Store