Concrete Research Laboratory

Director: Prof. Dr. Hamed Mohamed Hadhoud **Starting December 15, 2020**

Introduction

The Concrete Research Laboratory of the Faculty of Engineering, Cairo University is one of the main piers that revolutionized structural engineering in Egypt. The lab utilizes its available resources to conduct experimental tests concerning scientific research in the field of reinforced concrete for more than seventy years.

The Concrete Research Lab is considered one of the largest and well established Labs in the Middle East. The Lab was first established in 1931 as part of the Royal School of Engineering (now the Faculty of Engineering) of the Egyptian University (now Cairo University) located at a building next to the Heat Lab of the Mechanical Engineering Department. The lab was transferred to its permanent location in the Faculty Annex in 1939. The lab was under joint management with the "Foundation Lab" till their separation in the early fifties.

In 1990, the Concrete Lab was renovated to occupy an area three times the size of its previous one. The Lab new equipment is considered to be the state-of-the art in machinery. It allows the conduction of highly sophisticated tests and research. It includes a test base for investigating long span structural elements under loads with different directions. Also, a special section was constructed to test small-scale models.

Research activities

- Conducting scientific research on plain, reinforced and pre-stressed concrete carried out by graduate students and faculty members
- Organizing scientific conferences.

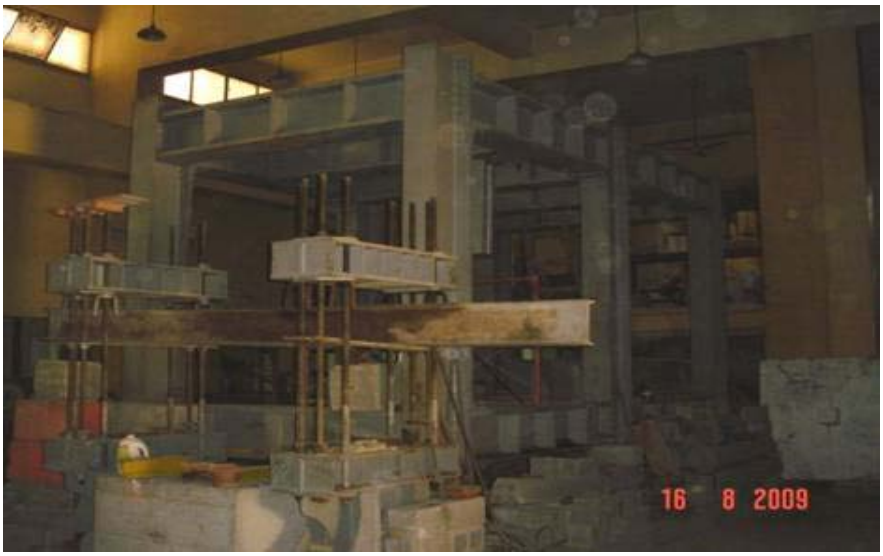
Beam Specimen During Testing

Facilities

Facilities include:

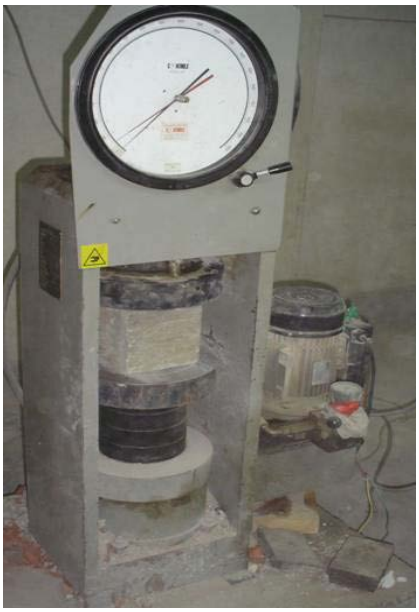
- 500 , 200 , 175 ton Universal testing machines
- A solid base with huge loading steel frame that allows testing using hydraulic jacks with high loading capacities
- A universal Shimadzu testing machine
- Modern instruments such as electronic loading machines in which loading can be controlled through displacements, and automatically monitored.
- Other modern instruments were added to the Lab to cope with the latest innovations in reinforced concrete research.
- Highly qualified technicians are managing the instruments under the supervision of teaching staff and professors in the field of reinforced concrete

Control Panel and Electronics for Testing



Strong Floor and Rigid Frame for Testing

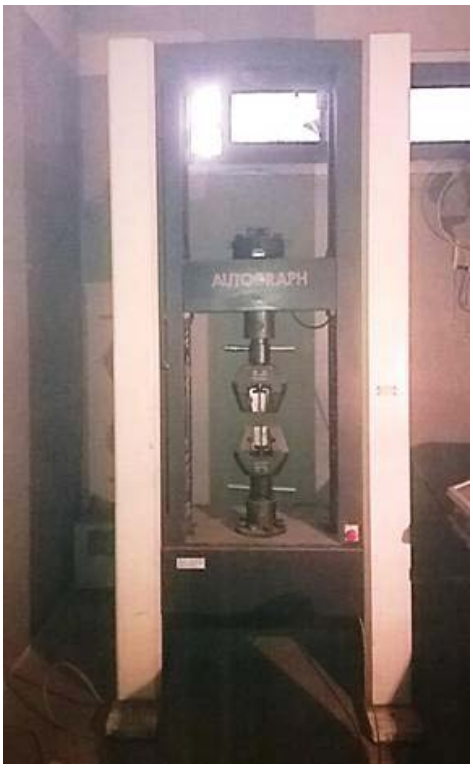
Beam Specimen after Testing



Concrete Cube Testing Machine

500 ton Hydraulic Testing Machine

175 ton Hydraulic Testing Machine



Computerized Shimadzu Testing Machine

Industrial Interaction

Concrete research laboratory, Cairo University is aiming at enhancing the scientific and industrial interaction and cooperation between the university and society through services for institutions, enterprises and engineering firms all over the country, including:

- Conducting necessary Lab experiments for quality control of concrete structures and assessment of different concrete structural elements.
- Conducting field experiments on different structures using non-destructive tests, e.g. ultrasonic waves, Schmidt hammer etc… Also conducting loading tests on existing structures, e.g. bridges, factories etc.
- Providing professional training programs for structural engineers.

Consulting Services

A- Field Tests

- Hammer tests for measurement of hardened concrete strength.
- Extracting concrete core specimens.
- Loading tests for different structural elements.
- Loading tests for concrete and steel bridges.
- Measuring strains and deflections due to loading of structural elements.
- Measuring vibrations (dynamic reactions) of structures and bridges.
- Locating the distribution and diameter of steel reinforcement bars, and the thickness of concrete cover in different structural elements.
- Ultrasonic and loading tests for pile foundations
- Measuring rate of steel reinforcement corrosion.

B- Quality Control

- Technical inspection of materials.
- Controlling concrete materials.
- Technical inspection before concrete casting.
- Technical inspection during and after casting.
- Assisting in project construction management.

C- Technical Reports

- Conducting necessary field inspections.
- Preparing structural safety reports.
- Preparing structural inspection reports.
- Suggesting methods for repairing and strengthening of defected structural elements.
- Preparing reports on reviewing structural designs.

D- Laboratory Tests

- Ensuring the conformity of concrete materials to technical specifications.
- Taking samples of concrete during casting for testing.
- Testing concrete specimens.
- Calibration of testing equipment inside and ouside the lab.
- Testing structural elements with almost full size.

- Preparing and testing small size models of different concrete structures and components.

E- Evaluation of Existing Structures Condition

- Conducting thorough technical examination for the structure condition.
- Conducting structural analysis for structures.
- Conducting field tests.
- Evaluating structural efficiency.

F- Structural Design

- Preparing structural design of reinforced concrete structures, including detailed drawings and calculation sheets.
- Preparing shop drawings for concrete structures.
- Reviewing structural designs.

G- Training Courses, Seminars and Conferences

The Concrete Research Lab contributes in enhancing the efficiency of structural engineers, and serving the engineering sector through providing training courses on the recent trends in the field, such as the new provisions in the Reinforced Concrete Code of Practice, the modern techniques for structural evaluation of existing concrete structures, and innovative techniques for repair and rehabilitation of structures. The lab arranges, as well, conferences and seminars in the field of structural engineering, such as the First International Cairo Conference on Concrete Structures and the Egyptian-Japanese seminar.

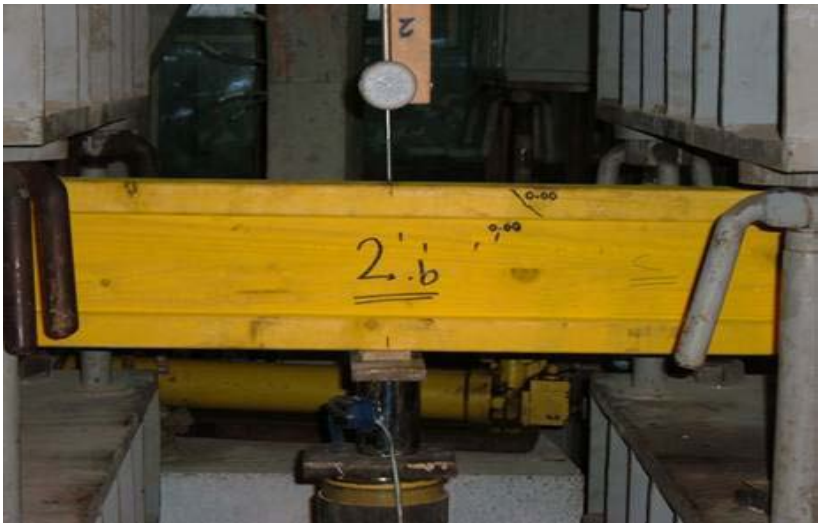
6th October Bridge Loading Test

Aswan Bridge Loading Test

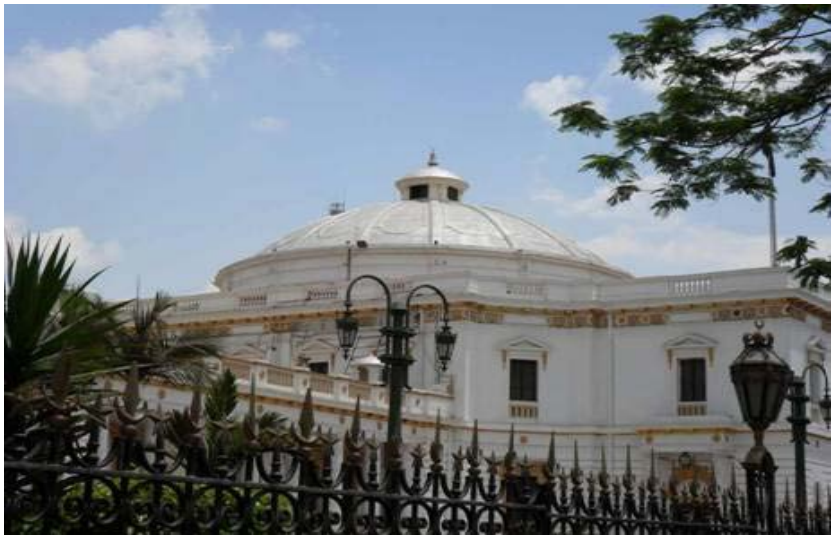
Pedestrian Bridge Loading Test

Railway Beam Loading Test

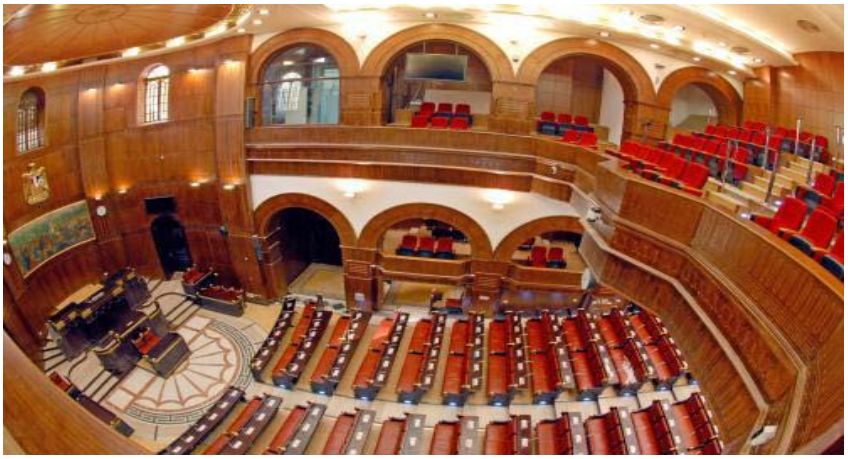
Framework Loading Test



Wooden Beam Loading Test



Design and Supervision of Repair Works of Parliament Building



Design and Supervision of Repair Works of Shoura Building

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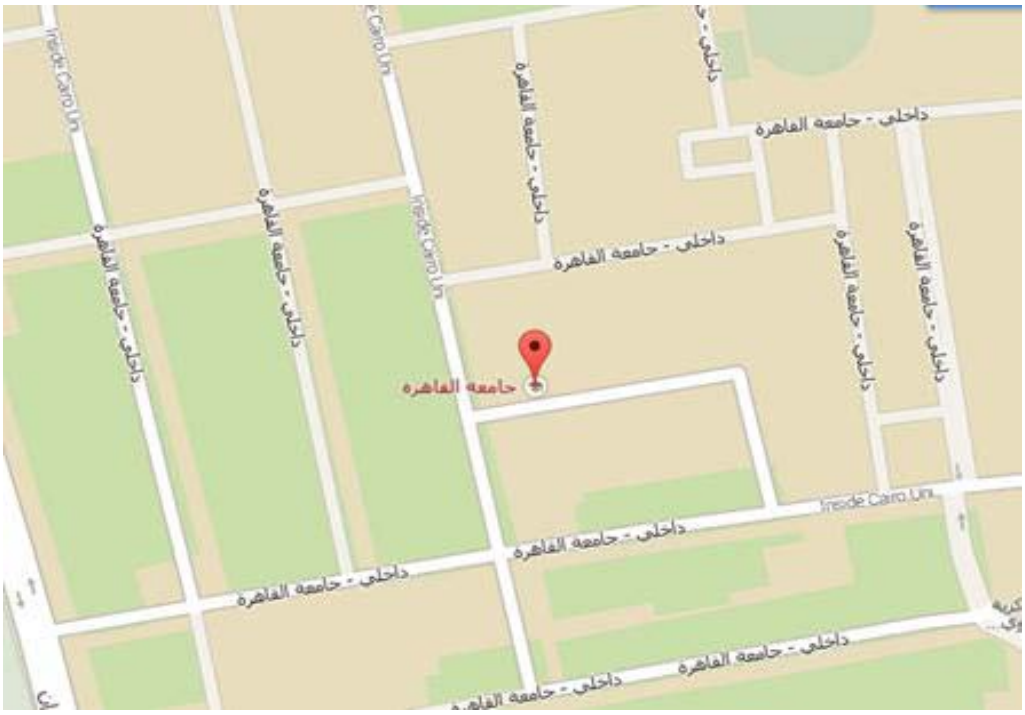
Map

30° 1’ 32.34” N
31° 12’ 37.26” E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