A Report on one day visit to
"CSIR - Structural Engineering Research Centre"
Visited by Department of Civil Engineering
on 26.09.2024

Submitted by: D Navitha(24695A0114) and N Radiya(23691A0130) from 2nd year under the supervision of Dr. Nakkeeran G, Asst. Professor, Department of Civil Engineering, Madanapalle Institute of Technology & Science.
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Mode of Conduct: Offline

Objective of the visit:

The primary goal of the visiting the CSIR-structural Engineering Research Center (CSIR-SERC) to know about advance technology in structural engineering and to enhance the research for future. The aim was to encourage the students to have a clear vison on technological breakthrough and innovations. Also, to enhance research undertaken by Civil Engineering Department, MITS with the support of CSIR Scientists.

Details on Visit:

Dr. Dipankar Roy, Professor and Head, Dr. Nakkeeran G, Asst. Professor, Miss N Radiya(23691A0130) and Miss D Navitha(24695A0114) from the department of Civil Engineering visited CSIR- SERC on its open day which was held on 26th September 2024. The following labs were visited on that day:

1)Advanced Material Laboratory:

The scientists of the advanced material laboratory this lab have developed ultra-high-performance concrete which is used for structures with complex geometry are produced with temporary supports the lab also has a structural testing equipment 2500kN servo-controlled UTM. In advanced material laboratory they developed 3D printable- ultra high-performance concrete, and ECO- friendly Geopolymer concrete (GPC) blocks with zero Portland cement. This lab focuses on high quality research on concrete technology and concrete durability with aiming at sustainable development of new materials.

In front of the Vigyan Auditorium

Students at CSIR-SERC

3D Printer (Advanced Material Laboratory)

3D Printing

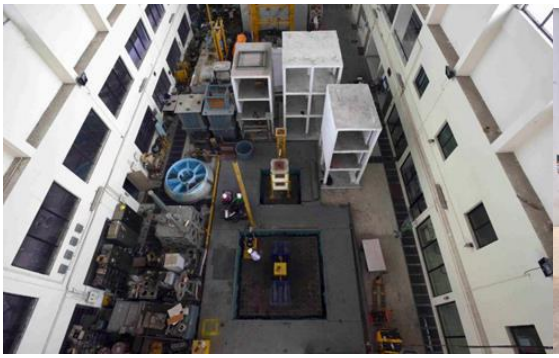
3D Printed shapes

Outcome:

This lab encourages us to know more about advanced materials and the blocks that were developed by geopolymer technology with different types of blocks (i.e., building blocks, paver blocks, hollow blocks and light weight blocks). Also, To research further about how to build a building using 3D printer with motor as geopolymer cement concrete.

2) Advanced Seismic Testing and Research Laboratory:

This lab has excellent facilities and expertise for the analysis, design and testing of structures and structural components. Advanced seismic testing and research (ASTaR) laboratory, with its state-of-the-art testing facilities, has contributed to fundamental and applied research in the field of earthquake engineering. It consists of tri-axial shake table systems made of two shake tables (possible for synchronization) and a pseudo-dynamic test facility.



Advanced Seismic Testing and Research Laboratory

Advanced Seismic Testing and Research Laboratory

Outcome:

This lab showcased experimental techniques for evaluation of RC and structural masonry buildings, seismic safety of specific typology of structures such as buildings with geometrical irregularities, open ground storey buildings and moment resisting frames.

3) Fatigue and Fractural Laboratory:

The Fatigue & Fracture Laboratory (FFL) at CSIR-SERC has excellent state-of-the-art facilities for conducting fatigue and fracture studies. The facilities available include a heavy duty four post rig plan dimensions of 3.5 m x 6 m x 7 m together with two horizontal reaction walls of 1 m wide and 7 m in height. The laboratory is equipped with servo-controlled fatigue testing systems with actuators of capacities: 250 kN (1 no.), 400 kN (1 no.), 1000 kN (2 nos.), hydraulic jacks (4 nos.), etc. In addition, the laboratory is also having Rotating Beam Fatigue Testing Machines (RBFM) at ±25kN and ±50kN loading capacity. Also, these fatigue testing systems are supplied with necessary hydraulic pressure of 210 bar from three units of hydraulic power packs of total capacity: 300 lpm @210 bar. The laboratory has the necessary facilities and expertise to carry out both research and sizing by uniaxial tension-compression difference techniques. The laboratory is also equipped with video microscope, multi-channel high-speed data acquisition system, and other multi-range measuring equipment capabilities.

Outcome:

This lab has given an excellent idea on fatigue performance of CFRP and reinforcement bar couplers of different diameters. We know about results of slip test, cyclic test and low cycle fatigue test on reinforcing bar couplers.

The overall outcome of this visit was to get to know about latest industrial research in areas like Structural health monitoring and life extension, disaster mitigation, advanced materials for sustainable structures, special and multi-functional structures, energy infrastructure and off shore structures, and to research further about how to build a building using 3D printer with mortar as geopolymer cement concrete. The visit proved to be highly useful and paved way to take our department research further with the support of CSIR scientists. Further visits with more number of students will be helpful to bridge the gap between academic and industry research.