

CENTRE FOR CONSULTANCY & RESEARCH

Centre for Consultancy and Research at AIT has been established to benefit the Industry and Society in particular the general public through its consultancy and research activities.

Adithya Institute of Technology (AIT), an Industry Integrated Institution was established in 2008 and run by Adithya Education Trust, its chairman Er.C.Sukumaran a renowned industrialist with 25 years of industry experience, adds a new dimension to academics. AIT is committed to provide quality education to the students through systematic teaching & learning. True to its tag line “*Industry Integrated Institution*”, all the students are given adequate practical exposure through industrial visits, industrial training, skill development training, product development etc.,. To substantiate this AIT has signed a no. of MoUs with industries.

AIT has excellent infrastructure and laboratory facility and resource team to pursue Consultancy and research activities.

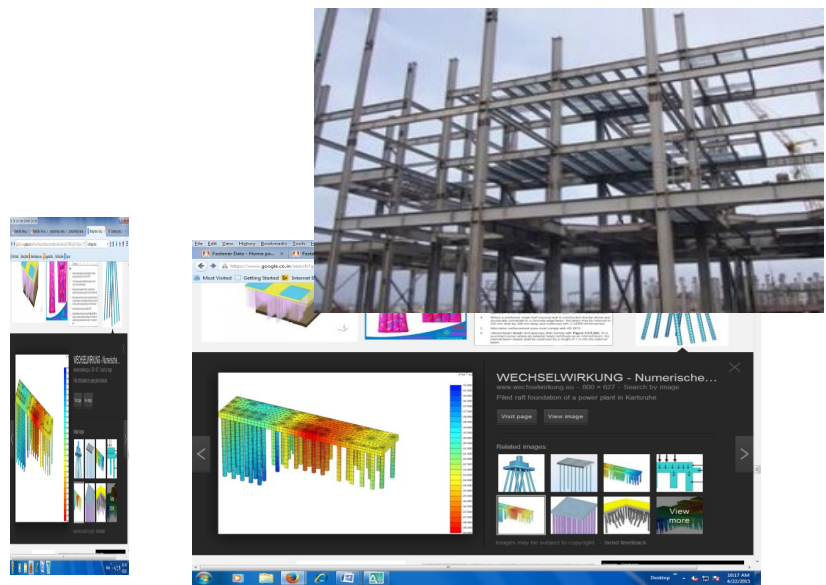
The performance, safety and stability of structures depend largely on their design and interaction with construction. The design methodologies provide insight into the behaviour of structure and its safety. Thus suggesting the need for the complete knowledge of load transfer mechanism (load path) from the structure to the foundation and to soil .

These in turn call for an improvement in Modeling & Analysis Techniques, Structural Design Process, and constructability.

The type of activities and facilities of Centre for Consultancy and Research are summarized as below

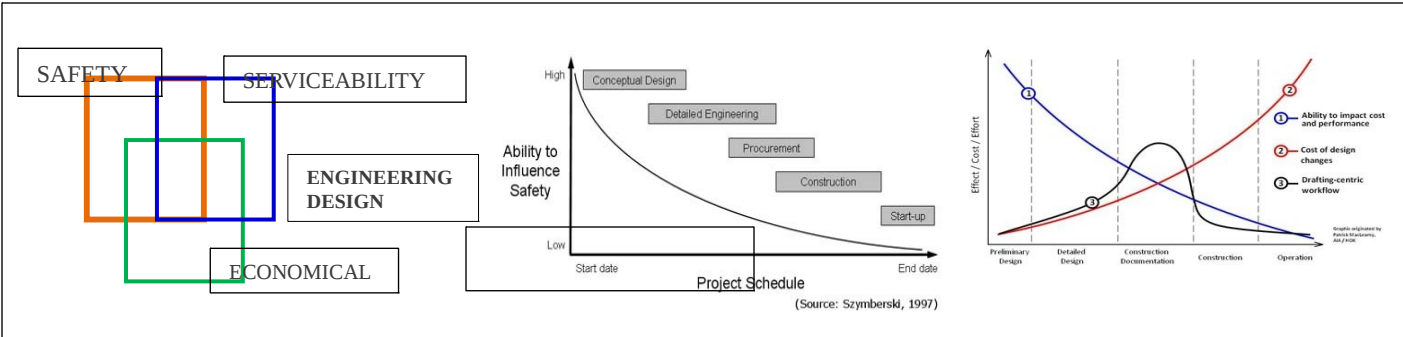
Main Focused Area of the Cell

- Civil & Structural Analysis and Design
- Earthquake Resistant Design
- Earthquake Resistant Design of secondary facilities (Water Piping, Electrical Installations, etc.) and Buried Systems (Water Pipe Lines, Gas Pipe Lines etc.)
- Seismic Auditing & Qualification of Buildings and Structures (Existing/New)
- Structural Retrofitting (Repair & Rehabilitation)
- Machine Foundation and Structural Dynamics
- Base Isolation of Buildings / Machineries
- Slope Stability and Land Sliding Analysis
- Surveying and Remote Sensing
- Design Calculation Vetting
- Finite Element Analysis



✓ Need for the Engineering Design

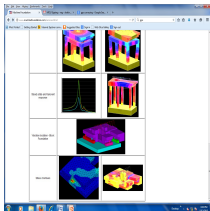
- Prime objective of any Structure or Building shall satisfy - Serviceability (served for the purpose of construction) – Safety - Economical .
- Through proper Engineering design, all the parameters shall be controlled and be in within the permissible limits as per standards.
- Design have much influence on the safety and cost as well by adopting proper methodologies, sizing of building elements, construction practice, avoiding wastage of Materials and Reworks etc.,.



➤ Our Cell carry the following Consultancy services in the Civil & Structural engineering field

1. Analysis and Design

- ✓ Planning, Designing and Estimation.
- ✓ Structural analysis and design of concrete and steel structures
- ✓ Buildings
- ✓ Industrial structures
- ✓ Marine structures
- ✓ Pipe racks
- ✓ Cement plant
- ✓ Power plant
- ✓ Design of foundations
- ✓ Structural detailing

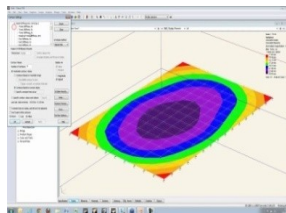


3. Vetting of Structural Design Calculations

- Proof checking of design calculation
- All types of structural Analysis
- Static and Dynamic Analysis
- As per Indian Standards & Codes.
- As per International Standards & Codes

4. Field services

- ✓ Construction site
- ✓ Site visit & consultancy (during construction)
- ✓ Preparation of as built drawings(post construction)
- ✓ Structural investigation
- ✓ Rebound hammer test
- ✓ vibration test - Machine foundation & structural members



2. Advanced Analysis and Design

- ✓ Dynamic analysis (linear & non-linear)
- ✓ Machine foundation
- ✓ Vibration and Isolation
- ✓ Seismic auditing & qualification
 - Plants / Structures / Machinery
- ✓ Failure Investigations
 - Vibration testing /
 - Fault identification
 - Trouble shooting

5. Research projects and Training

- Guidance and advise for the project works at all levels (UG, PG & PhD)
- Sponsored / Collaborated research and project work from Industry, Academy and General public
- Special training programs on Structural Dynamics, Earth Quake Engineering, Machine foundation, Tall Structures etc.,.

Testing

➤ ??? WHY TESTING IS NEEDED – Qualification for application

☐ Soil Test

The soil is the most important component yet most neglected part in a construction project. The Stability and life of all structures, buildings are based on the parameters and capacity of the soil. Soil is the natural foundation that supports all structures. Cost of soil test is less than 0.2 % of the total construction cost.

Soil investigation ensures the soil safe bearing capacity which helps the cost reduction of foundation and Safety (Stability) of the structure against the shrinking into soil.

☐ Construction Material Test

All the materials of the structural elements are subjected to loading and unloading process during construction and life time, hence the structure or structural members are undergo the deformations.

Material's mechanical properties ensure strength and safety of the structural members or structures.

✓ !!! SOLUTION

Proper testing & investigation on soil and material provide the knowledge on strength parameters and helps in the selection materials for an application or validate the materials for the construction.

➤ Soil Testing shall be carried out as per IS standards to arrive the at soil design parameters listed below

water content compaction
soil classification consolidation
sieve analysis bulk density
Liquid & Plastic limits shear strength
bearing capacity(SBC) Settlement calculations

➤ Construction materials Testing

- ✓ Compressive, Tensile, Flexural strength of Concrete elements like concrete cube, cylinder, beam...
- ✓ Yield strength, Ultimate strength and deformation of Reinforcement bars (rebars)
- ✓ Non-destructive test (NDT) for Strength of structural members (existing / new)

➤ Land Survey and Contour drawings preparation

Standard Theodolite Global Positioning System (GPS) Total Station

Testing facilities

✓ Soil Testing & Analysis

| | | |
|---------------------------|-----------------------------|----------------------------------|
| Direct shear test machine | Tri axial cell | SPT test apparatus |
| UCC testing machine | Consolidation test device | Liquid & Plastic limit apparatus |
| Plate Load Test apparatus | Soil permeability apparatus | Sieves |

✓ Construction material Testing

| | | |
|----------------------------------|--------------------------|-------------------------------|
| Aggregate testing machine | CBR Apparatus | Air permeability Apparatus |
| Compaction Factor test | Flexure Testing Machine | Bitumen Tests |
| Viscosity Testing Apparatus | Water absorbability | Loading frame 30T capacity |
| Bitumen Test -Marshall Stability | Cement testing apparatus | Rebound Hammer |
| UTM testing machine | Hardness Tester | Spring Tester / Impact Tester |

Need for Social Responsibility

As a part of social responsibility, it is mandatory to educate and provide awareness to the general public on constructability and safety of the building which is happened to be their dream house. In this regard the centre shall committed to provide the following services,

- Designing and distributing a booklet with no. of home plans and details to enable a common man to decide on requirements of construction variable like plot area, carpet area, materials & methods of construction, budget estimation etc.,
- To impart knowledge on testing of soil, construction materials and its necessity.
- Guidance and free consultation for house plan selections, options, cost estimation, merits & demerits of construction practice.
- Advise on safety of construction practice and structures due to earthquake, wind, rain and other safety aspects.

Under the aegis of Centre for Consultancy and Research, *Dr.Bhatia's Centre of Excellence for Structural Dynamics & Machine Foundation* has also been established.

The budding Engineers from technical institution could play a key role in technological up gradation, innovation and competitiveness of an industry. This Centre would be of major benefit to the student/Engineer to enhance their skill and knowledge.

Objective and services of the Centre

➤ Training

- Specialized training programs /workshops as per Industry requirements in the area of Structural Dynamics, Earthquake Engineering, Seismic Auditing & Qualification of Structures (new/existing), Vibration Analysis , Machine Foundation, Machine Vibration etc.

➤ Research and Development

- Identifying & carrying out research works based on the need of development with respect to engineering solutions for the industry & academia in the area of Structural Dynamics, Earthquake engineering, Vibration analysis, Machine Foundation

➤ Development of Laboratory Facilities

- Structural Dynamics Laboratory
- Soil Dynamics Laboratory

➤ Consultancy Services

- Structural & Soil Dynamics
- Machine Foundation (Analysis, Design and Testing)
 - Vibration Testing & Analysis, Isolation
 - Earthquake Resistant design & Seismic qualification of Buildings and Industrial structures.
 - Shock Qualification of Structures, Equipment and Piping
 - Failure Analysis
 - Dynamic loading viz. Wind, Blast, Impact, Earthquake

➤ Services to Public

- Awareness camps on Earthquake & Seismic preparedness
- Free Consultation on constructability & Earthquake related issues.
- Preparation and distribution of manuals on constructability & Earthquake design from construction point of view.

Head, Centre for Consultancy & Research(Civil & Structural)

Er.P.Shakivel has earned his Bachelor Degree in Civil Engineering from PSG College of Technology and Masters from Indian Institute of Technology Madras (IIT-M). He has more than 15 years of industrial experience out of which he has a rich experience of working with leading MNC companies like Bechtel (USA based), FLSmidth (Denmark based), Mott MacDonald Pvt Ltd (UK based), Mammutt Group (Dubai based) etc., at various senior levels. Throughout his career, he has worked in the projects of India, USA, Canada, Europe and UAE in the field of Buildings (Residential. Commercial, Institutional etc.), Cement plant structures, Oil & Gas sectors , Marine Structures (jetties), Machine foundation and Structural Dynamic areas of civil engineering applications.

- Member – Indian Society for Technical Education (ISTE)
 - Member, Bureau of Indian Standards- CED 43 Foundations Subjected to Dynamic Loads (IS 2974)

Advisor

Dr K G Bhatia, CEO, D-CAD Technologies New Delhi.

Formerly:

President - Indian Society of Earthquake Technology
General Manager - Bharat Heavy Electricals Ltd.,
Member- SERC, CSIR, DST, BIS
Member - DST - Committee on Augmentation of shake table facility at Univ. of Roorkee
Member - Advisory Committee, Dept. of Applied Mechanics, I.I.T Delhi
He has contributed immensely to the industry for more than 35 years, carried out extensive work on Structural Dynamics and Machine Foundation Design for the Power plants (Thermal, Hydro, Nuclear), Refineries, Petrochemicals Industry & Other Allied industries. He was working at EIL initially and then at BHEL for almost 25yrs. He has received recently “ *Honory Engineer Award*” from IISEE in 2012.

Presently:

- ☐ Member, Bureau of Indian Standards on the following committees:
 - CED 39 Earthquake Engineering (IS 1893 - Pt 1 - main body)
 - CED 39:6 Industrial Structures (Convenor IS 1893 - Pt 4)
 - CED 37 Structural Safety of buildings (IS 875)
 - MED 28 Mechanical Vibration and Shock
 - CED 43 Foundations Subjected to Dynamic Loads (IS 2974)
- ☐ Recently Dr.K.G.Bhatia has been recommended for the Prime Minister, Nepal Government as an advisor for Rehabilitation of Nepal Earthquake (2015) by Mission Malavya of IIT Roorkee.

OUR MOTTO:

**ADDING IMPORTANCE TO
SOCIETY & ENGINEERING
FRATERNITY**

Adithya Institute of Technology

Centre for Consultancy & Research(Civil)

Sathy Main Road, COIMBATORE.

Phone: 82207 68061 & 9865004238

<http://adityatech.edu.in> & aitccrcivil@adityatech.com



Adithya
Institute of Technology, Coimbatore

Beyond Engineering

Industry Integrated Institution