VIRTUAL SMART STRUCTURES & DYNAMICS LABORATORY (VSSDL)

Department of Civil Engineering, IIT Delhi

A constituent of V-Labs

Indian Institute of Technology Delhi

VSSDL
IIT Delhi

Ministry of Education

An initiative of Ministry of Education(MoE), under the National Mission on Education Through ICT

Welcome to Virtual Smart Structures and Dynamics Laboratory (VSSDL- VLabs)

This laboratory provides platform to inquisitive students to perform basic experiments through simulation related to smart structures and structural dynamics.

A smart structure is defined as a structural system having built-in or intrinsic sensors, actuators and control mechanism, whereby it is capable of sensing a stimulus, responding to it in a predetermined manner and extent, in a short time, and reverting to its original state as soon as the stimulus is removed. In the present context, the structures have been instrumented with smart piezoelectric material based sensors, which inform the status (here dynamic characteristics) to the user.

Lack of resources has always been a hurdle to perform experiments, especially when they involve sophisticated and expensive instruments. Also, good teachers are always a scarce resource. With the development of virtual labs, above limitations can no more hamper students and researchers in enhancing their skills and knowledge.

*The Civil Engineering Department new updated provides the service of Virtual Laboratory via cloud at: **http://vssd-iitd.vlabs.ac.in/**.Older archieves including trigger based experiments are still available at http: **www.ssdl.iitd.ac.in/vssdl/home.html**.*

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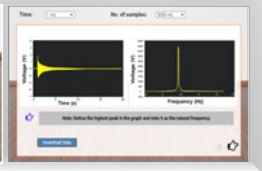
Areas of Interest:

- Structural health monitoring
- Smart materials and structures
- Non-destructive evaluation
- Experimental structural identification
- Bio-mechanics
- Energy Harvesting

BRIEF DESCRIPTION OF EXPERIMENTS

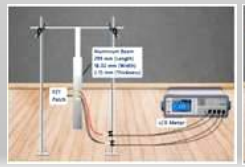
Experiment 1

Vibration Characteristics of Cantilever Beam Using Piezoelectric Sensors



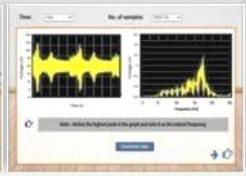
Experiment 2

Identification of High Frequency Axial Modes of Beam in "Free-Free" Condition Using Electro-Mechanical Impedance (EMI) Technique



Experiment 3

Forced Excitation of Steel Beam Using Portable Shaker

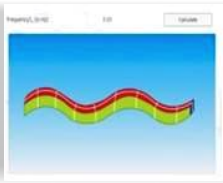


Experiment 4

Photogrammetry for Displacement Measurement

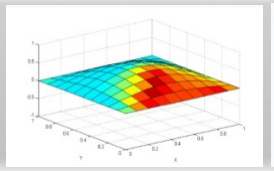
Experiment 5

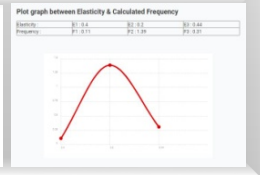
Modes of Vibration of Simply Supported Beam Under Flexure



Experiment 6

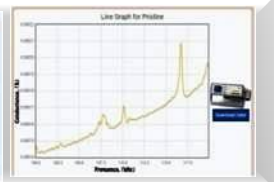
Modes of Vibration of Simply Supported Plate





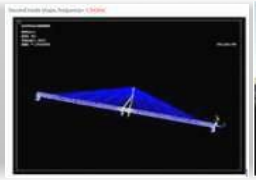
Experiment 7

Damage Detection and Qualitative Quantification Using Electro-Mechanical Impedence (EMI) Technique



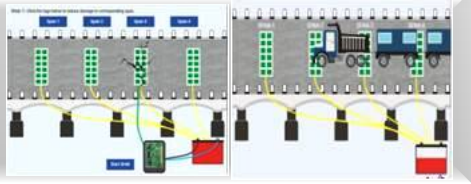
Experiment 8

Dynamics of Bandra Worli Sea Link Bridge



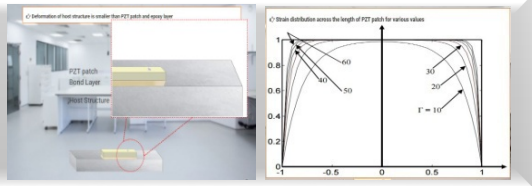
Experiment 9

Piezoelectric Energy Harvesting and Structural Health Monitoring Using Thin Surface Bonded PZT Patches



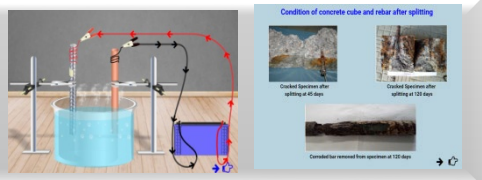
Experiment 10

Shear Lag Effect in Electro-Mechanical Impedance (EMI) Technique



Experiment 11

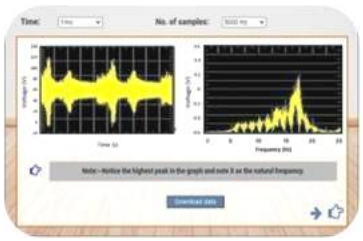
Rebar Corrosion Detection and Assessment Using Electro-Mechanical Impedance (EMI) Technique



Physical Lab at IIT-Delhi triggered remotely

Team member demonstrating how to perform experiments.

Data representation of the Experiment at student's PC



Trigger based experiment view at student's PC

Students interacting and performing the experiments at V Labs

VSSDL Team Members

Prof. Suresh Bhalla

Sameer Hasan

Collaborating Members

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Dr. Visalakshi Talakokula,(Mahindra University, India)

Dr. Sumedha Moharana,(Shiv Nadar university, India)

Please visit http://vssd-iitd.vlabs.ac.in/