Department of Civil Engineering and Engineering Mechanics
Columbia University

Tuesday, March 20, 2012 (2:30-3:30 pm)
644 Mudd

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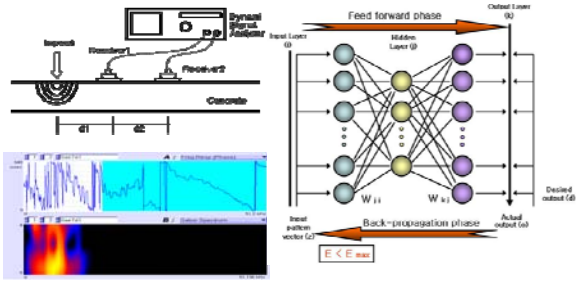
(Host: Prof. Huiming Yin)

DEVELOPMENT OF STRUCTURAL ASSESSMENT SYSTEM USING NONDESTRUCTIVE TESTS & ARTIFICIAL NEURAL NETWORK

Civil engineering structures, such as buildings, bridges, dams, tunnels, etc. deteriorate with time. In order to repair and alter such structures, structural assessment is needed. Again, when the forms of fresh concrete works are removed, contractors need to investigate the compressive strength of concrete members. To measure the strength, thickness, etc. of structural members, and detect defects such as voids, cracks and delamination, nondestructive tests (NDT) like the impact echo method, spectral analysis of surface waves (SASW), ultrasonic pulse velocity method etc. can be used. To detect defects in structures, a new diagnosis system using NDT and ANN has been developed. The major topics to be discussed in this seminar are:

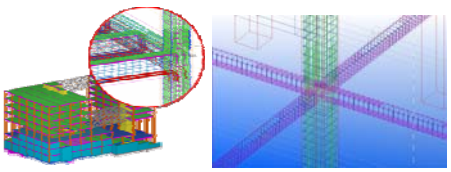
- Principles of wave propagation; impact echo, SASW and ultrasonic pulse velocity methods; artificial neural network
- Experimental works of NDT and signal processing
- Algorithm for assessment of structural defects using NDT
- Graphic User Interface
- Current research: development of concrete crack detection using NDT



DEVELOPMENT OF ADD-ON PROGRAM FOR RE-BAR PLACEMENT IN THE BUILDING INFORMATION MODEL (BIM) ENVIRONMENT

AEC (Architects, Engineers, Contractors) industry is recently experiencing the paradigm shift from 2D AutoCAD production era to 3D design and production era called Building Information Modeling (BIM). Development of Add-on program is necessary for the placement of reinforcement bars on the physical modeling of 3D BIM platform, Tekla structure. Time for the design and shop drawing production can be substantially reduced. The topics to be discussed in this seminar are:

- Introduction to BIM tools: Tekla structure, ETABS, ADAPT, etc.
- API (Application Programming Interface)
- Algorithm development for the re-bar placement in 3D BIM
- Implementation of Add-on Program



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