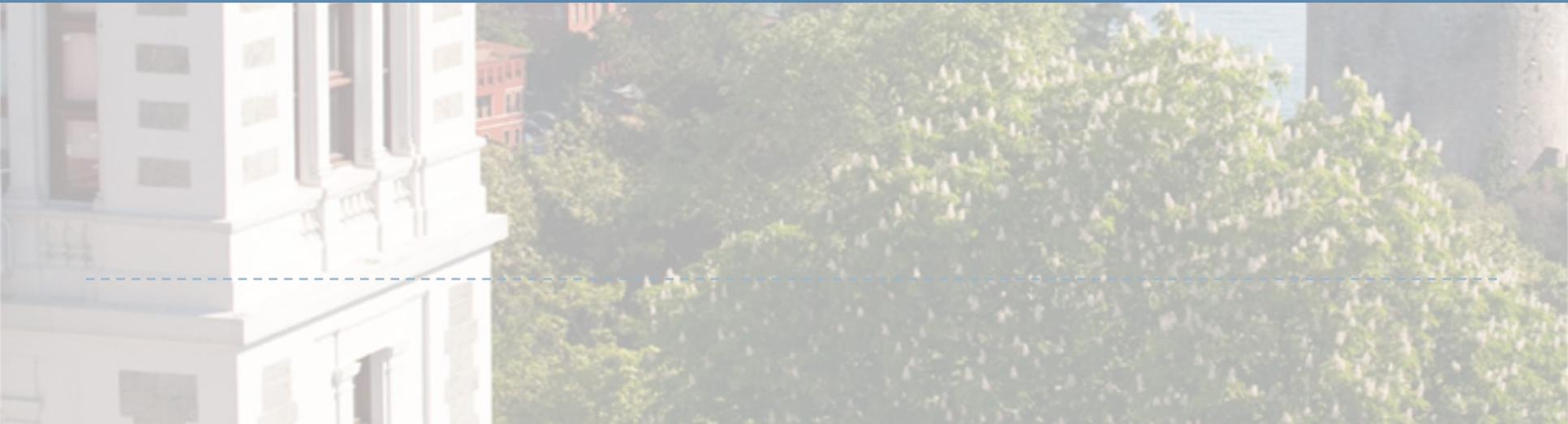


Research at BU – Civil Engineering

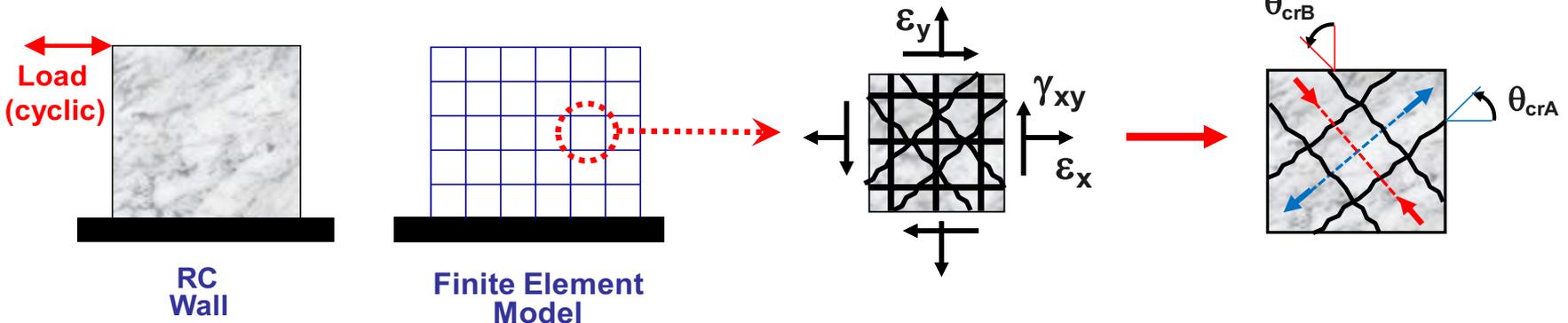
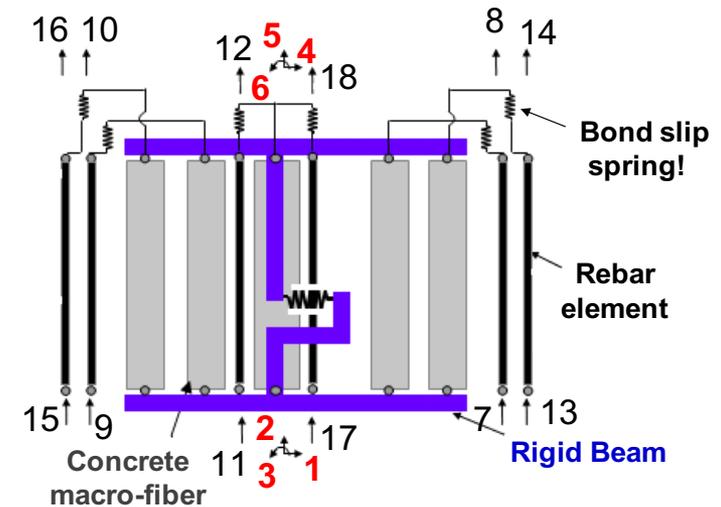
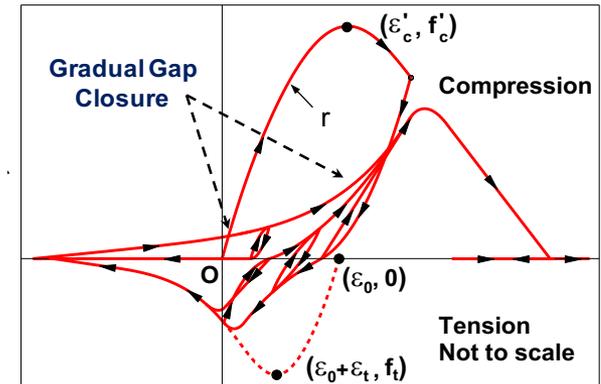


Research in Structural Engineering



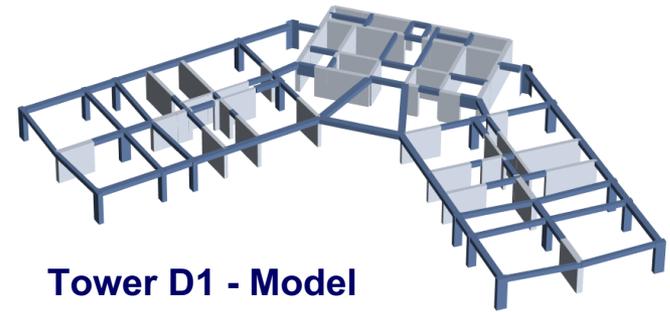
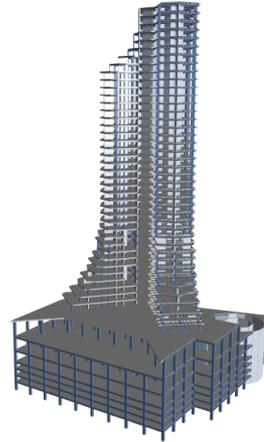
RC Structures: Modeling

- Development of novel modeling methods for simulating nonlinear reinforced concrete behavior:
 - Material constitutive modeling
 - Macro (phenomenological) modeling
 - Finite element modeling
 - Implementation into open-source computational platforms (e.g., OpenSees)



RC Structures: Analysis, Design, Testing

- Nonlinear modeling and seismic response analysis of RC systems for application/improvement of performance-based design approaches.

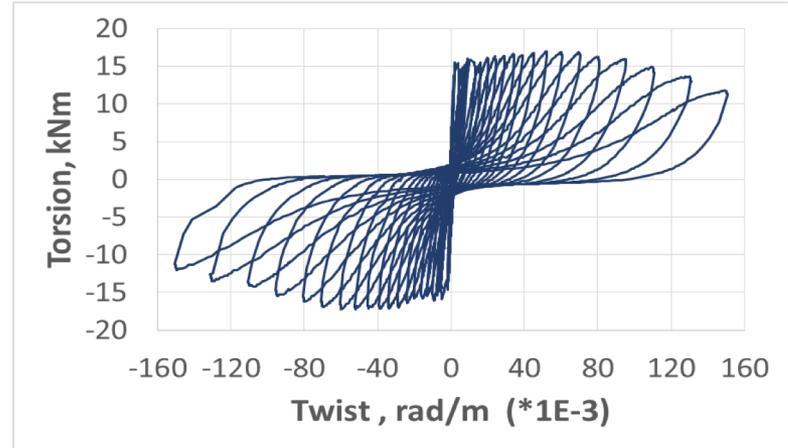


- Laboratory and field testing of RC components and systems.

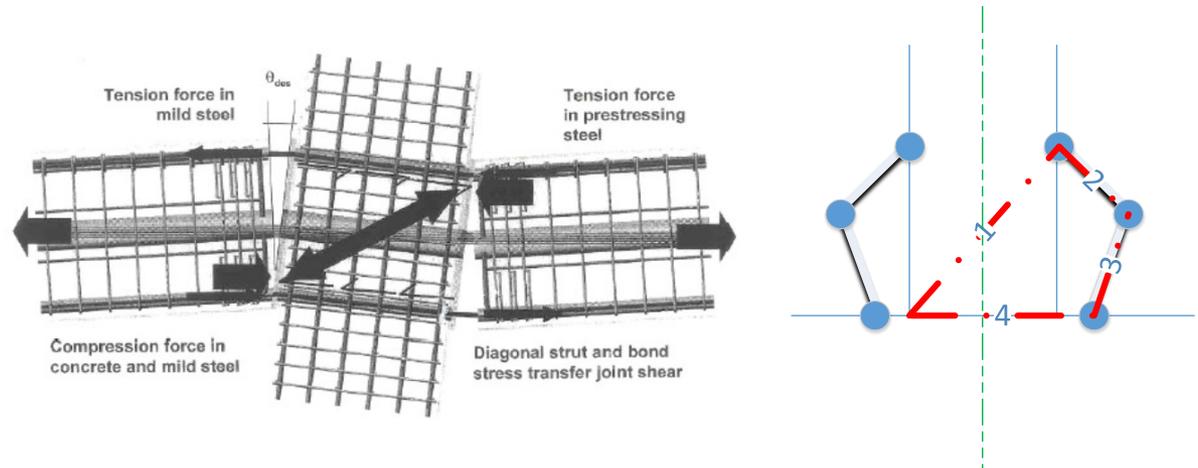
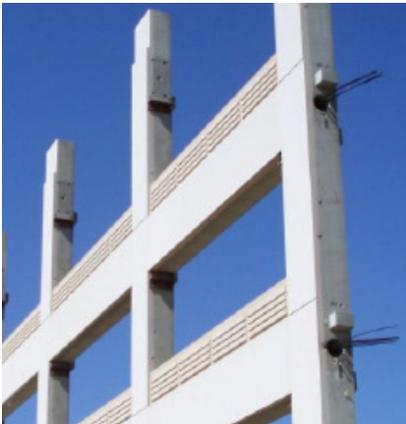


RC Structures: Analysis, Design, Testing

- Experimental research on behavior of RC member under cyclic torsion.

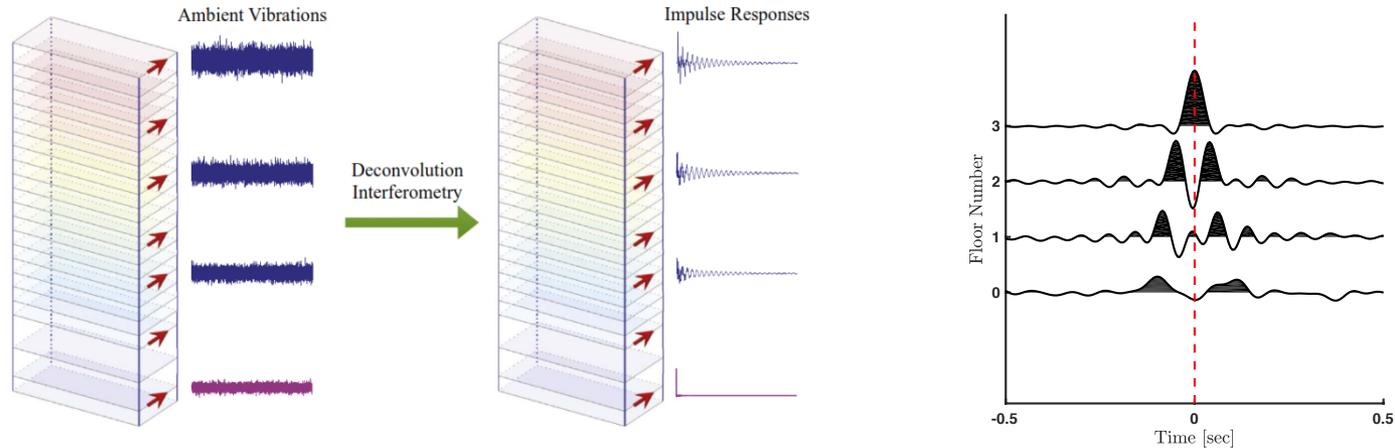


- Development of a damping mechanism for precast post-tensioned beam-column joints for seismic protection.

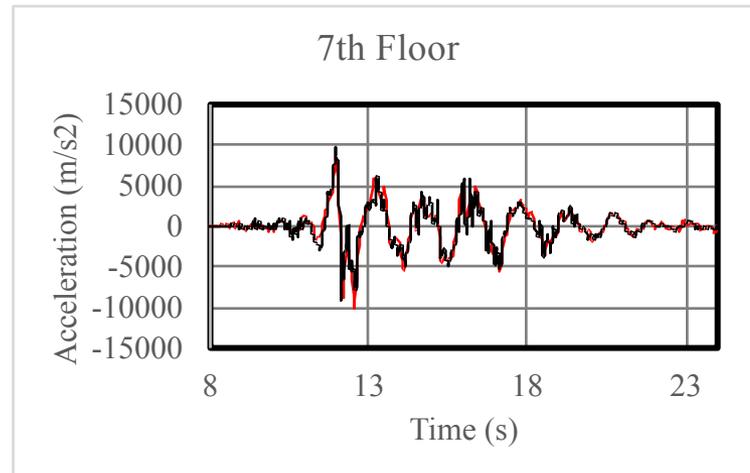
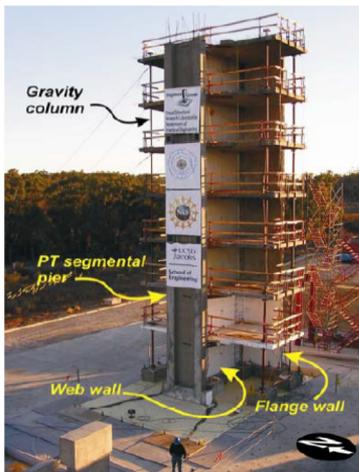


System ID of Structures

- Determination of input energy profile in structures through seismic interferometry analyses.

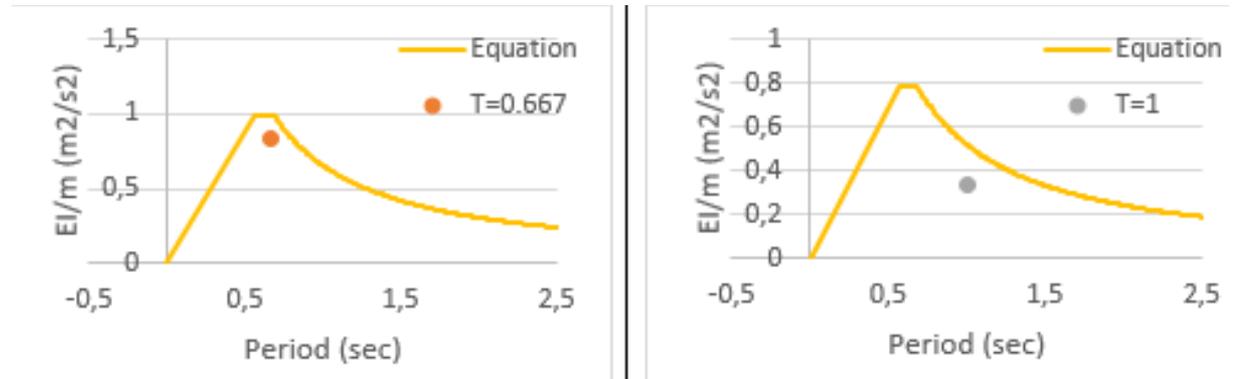


- Determination of dynamic responses of structures on shaking table through image-based methodology.

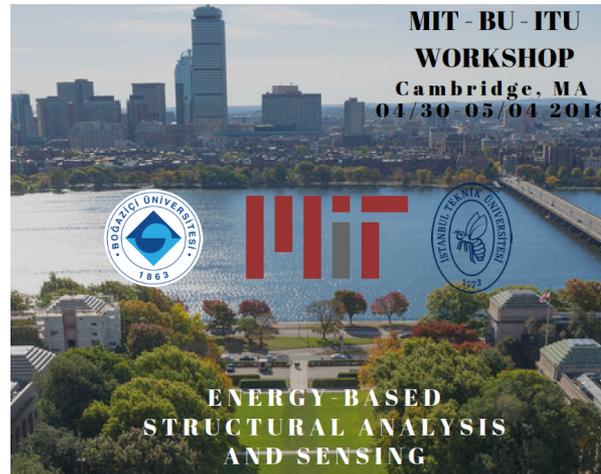


Energy-Based Analysis and Design

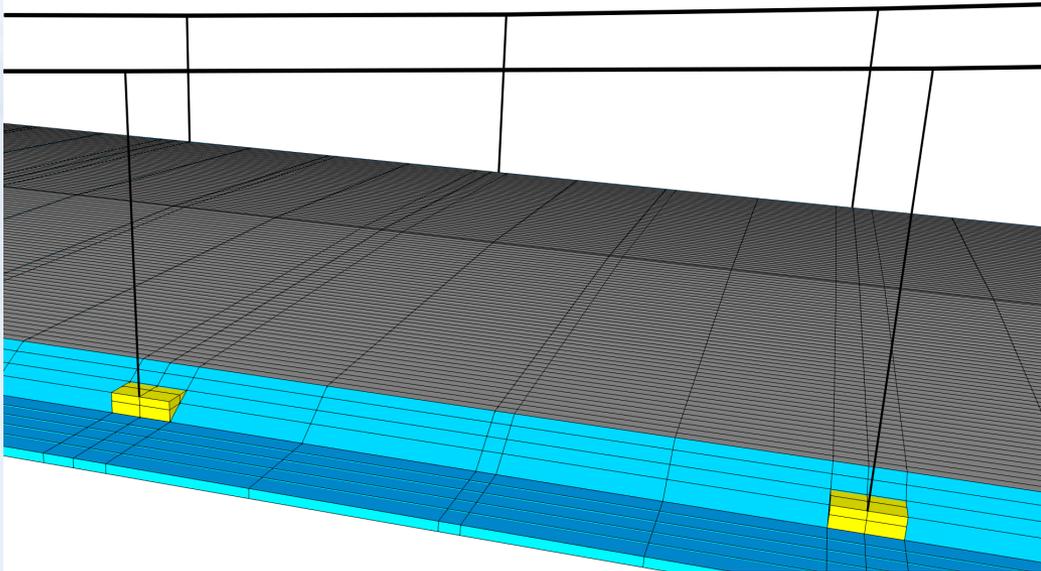
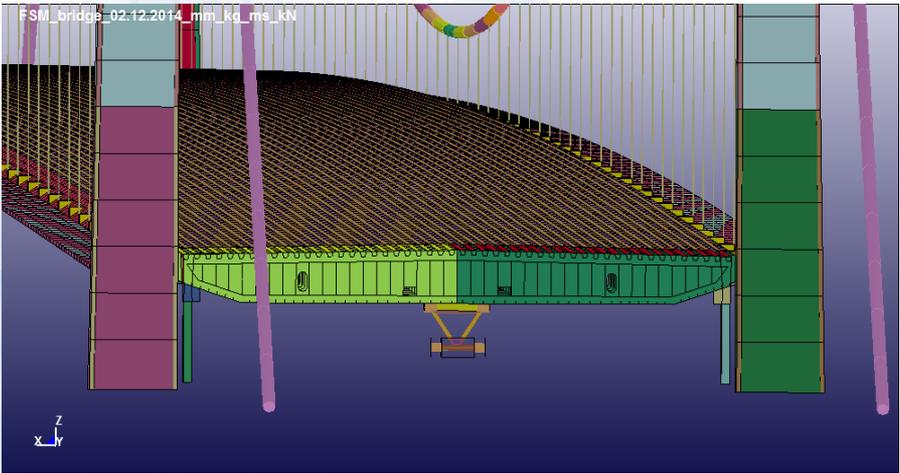
- Mass-normalized energy spectrum through analytical and experimental was developed.



- Collaboration with MIT through MISTI workshop on Energy-Based Structural Analysis and Sensing.



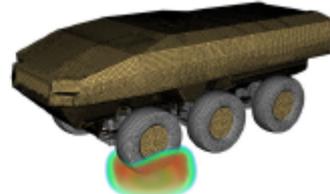
Modeling of Steel Suspension Bridges



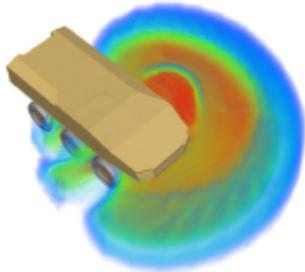
Blast Simulations of Armored Vehicles



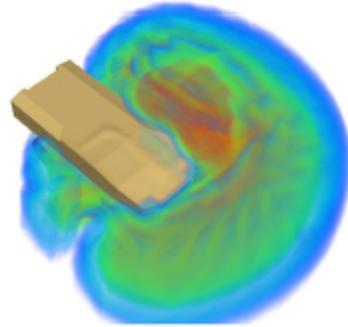
(a) 40 μ s



(b) 200 μ s



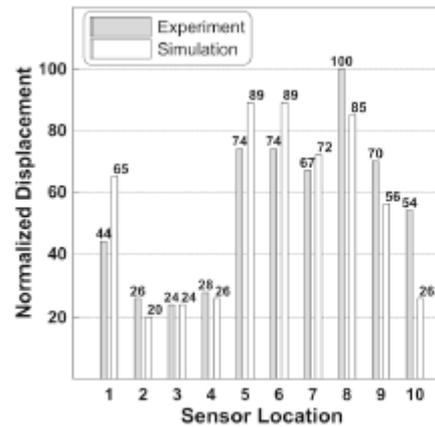
(c) 5500 μ s



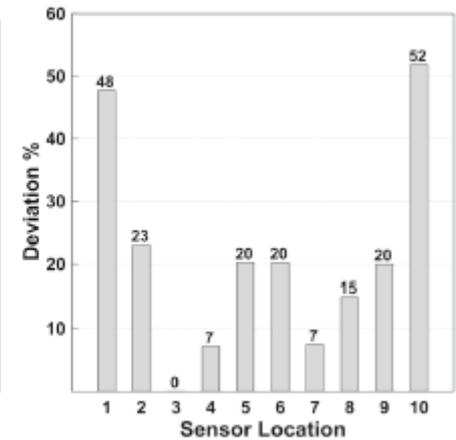
(d) 7000 μ s



(a)



(b)



(c)

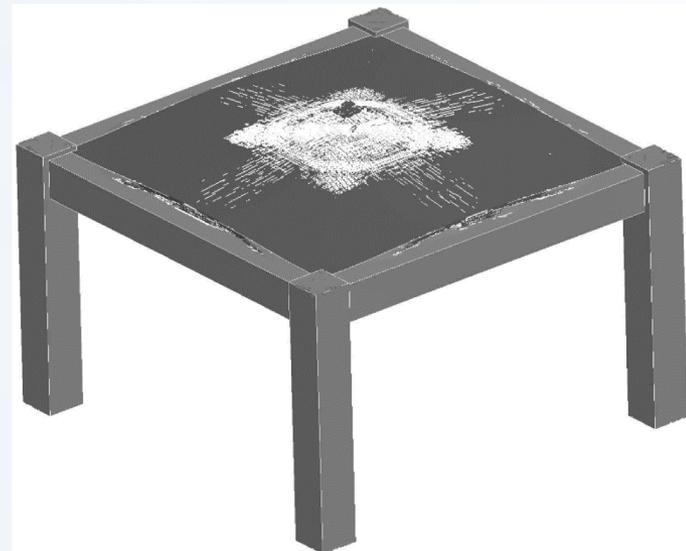
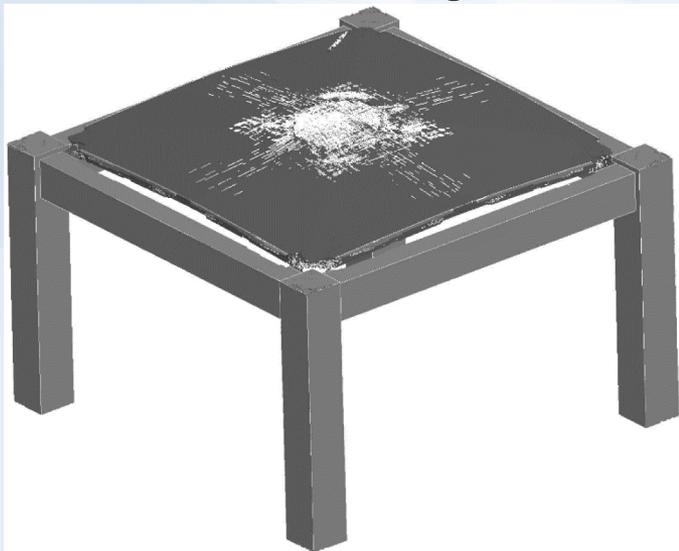
Blast Resistance of Reinforced Concrete Slabs



Civilian Design



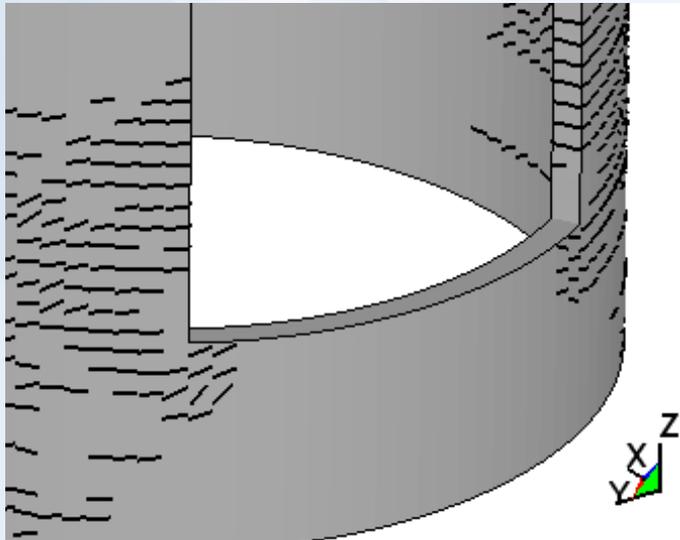
Protective Design



Seismic Sloshing Effects in Petrochemical Storage Tanks



Seismic Performance of Reinforced Concrete Industrial Chimneys



STRUCTURAL HEALTH MONITORING

Long-term monitoring of
Bridges/ Tall Buildings/Historical Structures/Wind Turbines



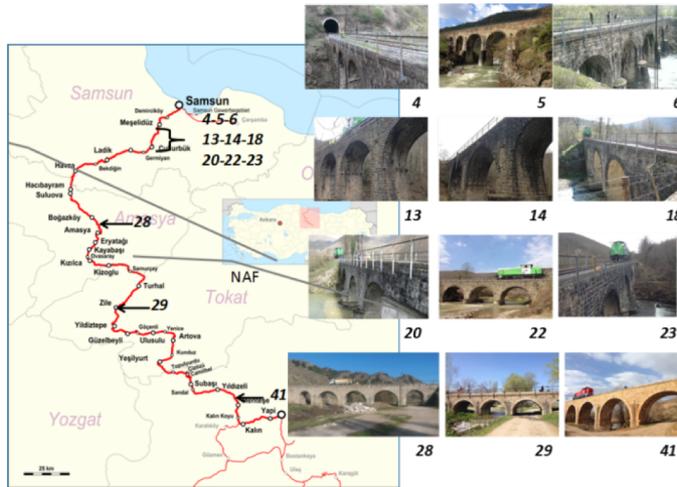
SHM of 1 MW Wind Turbine
under changing operational
and environmental conditions



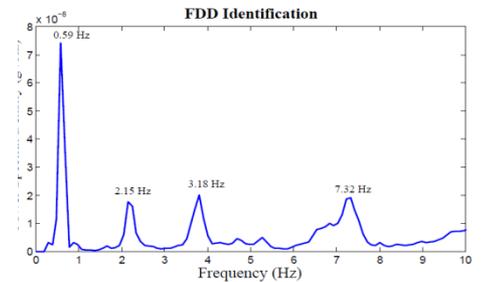
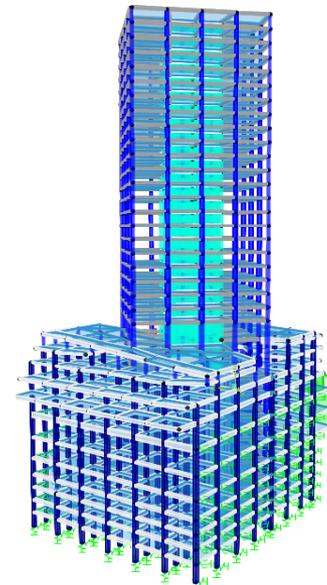
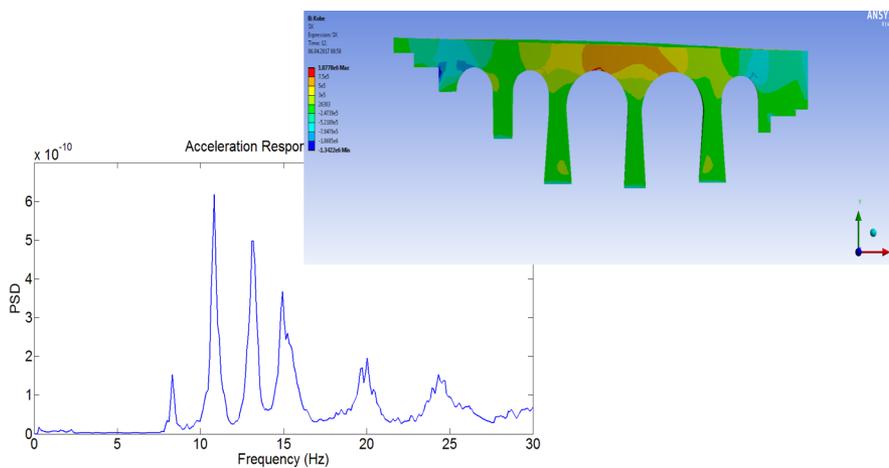
SHM of Bogazici Suspension Bridge
during Hanger Replacement

System ID & FEM Updating & Seismic Performance Assessment of

Stone Arch Bridges



Tall Buildings



- *Fire engineering concepts in structural engineering require thinking rather unconventionally and outside the box.*
- *The analysis of any fire problem requires knowledge of*
 - *fire science*
 - *egress*

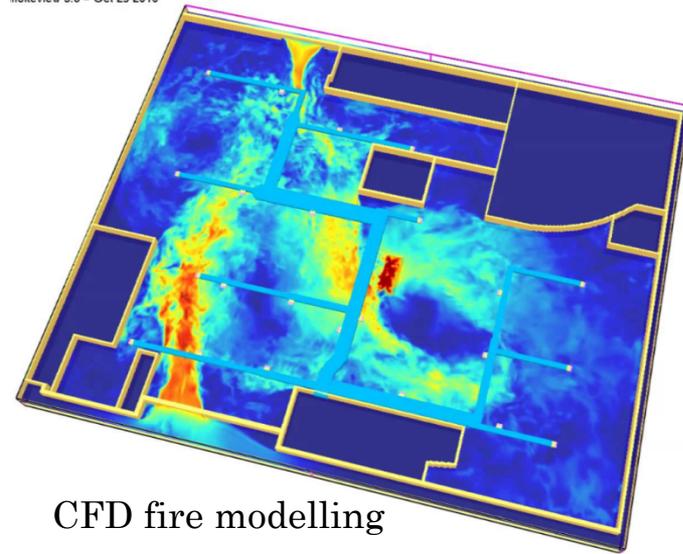
human aspect

 - *heat transfer*
 - *nonlinearities in both geometry (large displacement) and material mechanical properties*
 - *structural resistance capacity, thermal expansion and thermally induced forces/moments*

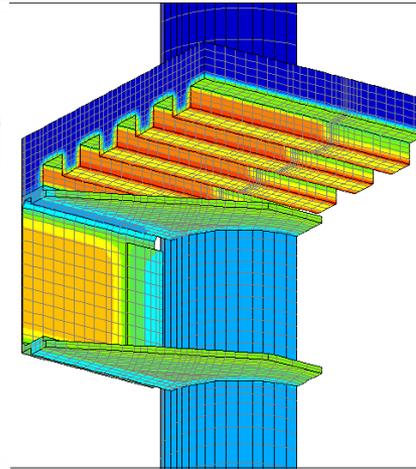
structural aspect

Fire Engineering

nokeview 5.6 - Oct 29 2010



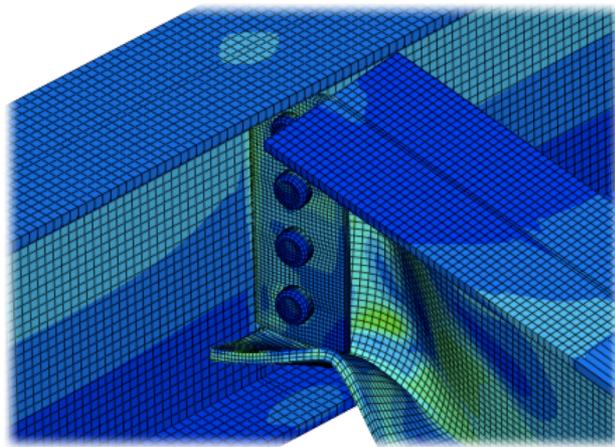
CFD fire modelling



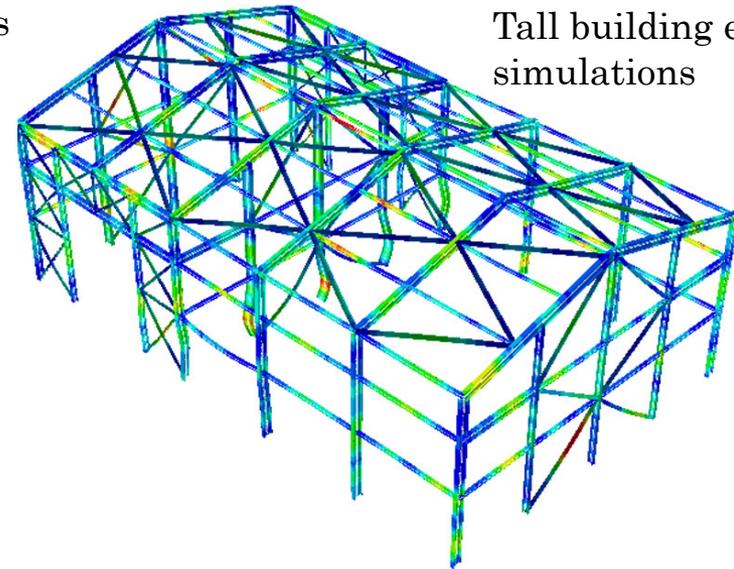
3D heat transfer simulations



Tall building egress simulations



Fire performance of steel connections



Stability of steel industrial buildings under fire

Thank you

