Structural Dynamics and Acoustic Systems Laboratory
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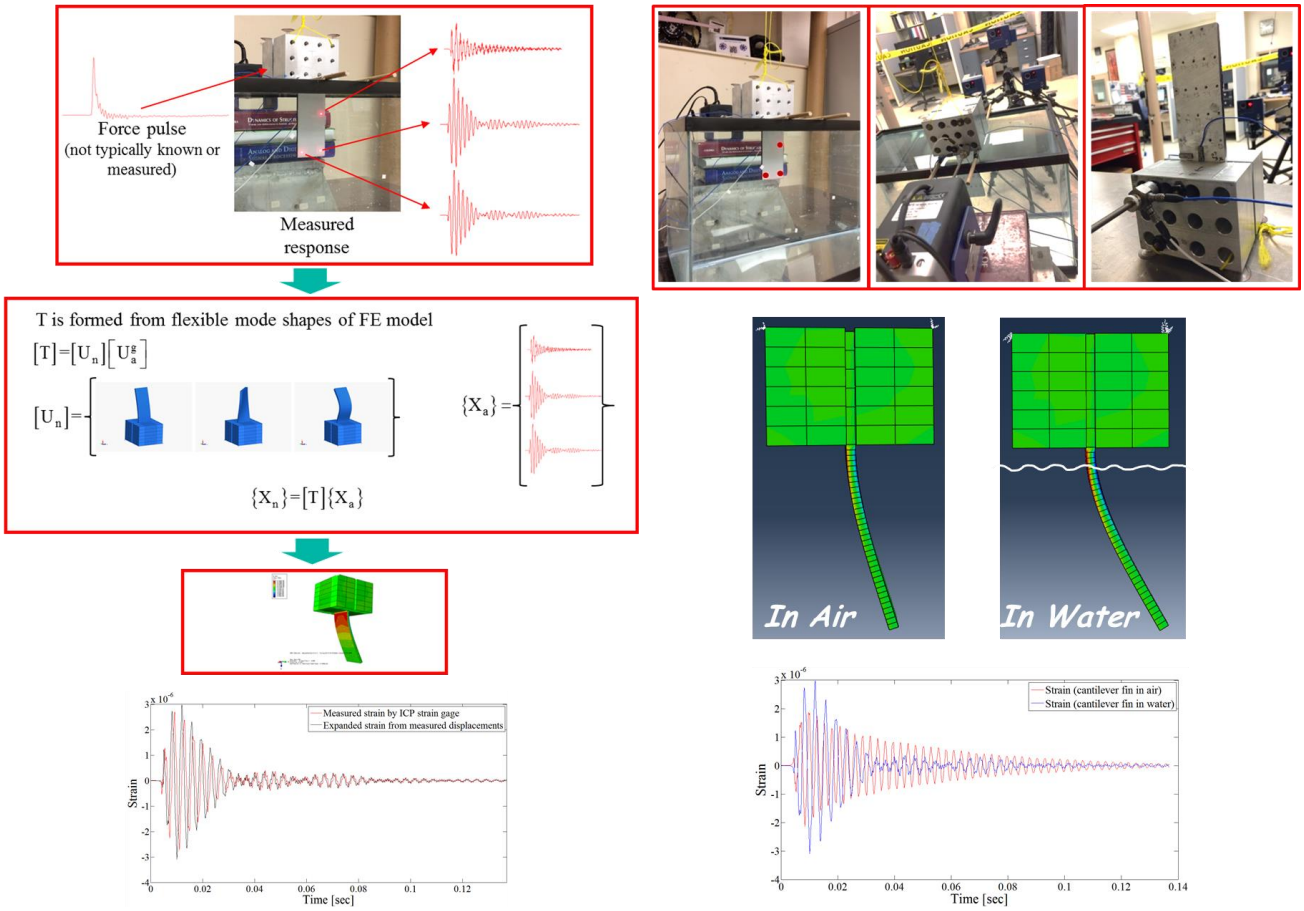
Underwater Dynamic Response at Limited Points Expanded to Full-Field Strain Response



Expansion of real time operating data from limited measurements to obtain full field strain data has been performed for structures in air. This approach has shown great success and its main advantage is that the applied forces do not need to be identified. However, there are applications where structures may be immersed in water and the full field real time response may be needed for design and structural health assessments.

This work presents the results of a structure submersed in water to identify full field strain response using only a handful of measured data. The same approach is used to extract the full field strains and the results are compared to the actual full field measured response. The advantage of this approach is that the force does not need to be identified and, most importantly, the damping and fluid structure interaction does not need to be identified in order to perform the expansion. The results show excellent agreement with the measured data. Another interesting observation is that the effects of water loading produces higher strain in water than air due to the unmeasured loading effects of water on the fin.

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