

1. Report Title and Type (*Thesis/Research Study/Dissertation/Project*)
 - Feasibility Study on Structural Health Monitoring of Multi-span Prestressed Concrete Bridges by Using Ambient Thermal-induced Responses. (Thesis)
2. Name of the Author
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4. Field of study
 - Structural Engineering
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7. Expert Comments on the Work and Facility for the Feedback from the Users
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8. Abstract of the work

- This thesis deals with a methodology for the use of ambient thermal responses as damage detection implement of structural health monitoring (SHM) of multi-span prestressed concrete bridge girders. To learn in details about characteristics of thermal loads and thermal-induced responses of multi-span prestressed concrete bridges. This study is the first and most important step leading to real application of the structural health monitoring by using thermal-induced loads and responses with existing multi-span prestressed concrete bridges. Knowledge obtained from this study will serve as an essential basis for developing of such structural health monitoring in the future. an experiment on a scaled model of two-span prestressed concrete bridge will be carried out, where thermal-induced responses, such as thermal-induced strains of concrete and reinforcement, deflections, and reaction forces, will be continuously monitored and recorded. The responses of the experimental bridge under various states of damage will be compared in order to understand more about effects of damage on thermal-induced responses. Preparation, instrumentation as well as progress of official test are described in this report. Experimental results show that damage stage due to cracking of structure can be identified successfully by analyzing thermal response of model to ambient thermal loading and among others reaction forces and responses thermal strain of bottom fiber should be considered as a key aspect for monitoring. However, in this thesis some results cannot be explained clearly now due to lack of a detailed mathematical model, it is suspected to be caused by absence of ability to soften degree of thermal induced deformation of the more rigid polymer bearings.

9. Keywords
 - Structural Health Monitoring, thermal-induced responses, ambient, multi-span, prestressed concrete bridges.

10. Bibliographic data

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11. Type of project

- Non-sponsored

12. Details of the Sponsor/Donate

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13. Specific Agreement involved in the Sponsorship Agreement, if applicable

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14. AIT Code Number

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