

VIBRATION ANALYSIS OF DECK SLAB BRIDGE

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Summary-The roads are modern transport chains and bridges are the most important elements of vital transportation systems. They are prone to failure if their structural deficiencies are not identified. an oversized range of world tour bridges were of style throughout the quantity once the bridge had no codes unstable design provisions, or once these provisions were meager by the standards. In addition, due to aging and therefore the growth of hundreds of transportation amplitude and volume, several existing bridges in India experience deterioration. Because recent bridge construction involves a huge time and money, repair and rehabilitation of former and broken bridges are necessary to preserve their ability to charge and repair performance. in the present study, a model by linear finite elements in three dimensions cement concrete bridge was developed and analyzed, package abuse Anysis (, forced vibration free).

Key Words: bridges, static, free, forced (modal, , harmonic, transient)vibration

1. Introduction: Sudden failure or very extreme bridges due to battery collapse was observed in all major seismic events. The earthquake occurs in Gujarat, January 26, 2001 demonstrated that force alone would not be sufficient to ensure the safety of bridges in the earthquake. Research is now focused on finding more rational solutions and justified for the protection of bridges severe earthquake

attack. to reduce seismic forces or reduce inelastic deformations seismic isolation. It reduces the fundamental frequency structural vibrations at a value below the frequency containing the predominant energy of the earthquake. The isolating device, which replaces the conventional bridge bearings, decouples the bridge deck of the bridge substructure during earthquakes, which significantly reduces the acceleration of the bridge and therefore the battery forces transmitted

2.Literature Review:

DpThambiratnam and GH brameld1995: This article examines the natural frequencies and associated modes of bridge superstructure .it compares field observations with theoretical idealizations and finds that the idealization widely used is accurate only in relation to certain types of bridges, and many bridges require more detailed analysis. He developed a simplified method to accurately estimate the fundamental frequency of bridge modeled as a grid, the paper also discusses the importance of the support rigidity, and the dynamic modulus of elasticity of concrete, in the estimation of natural frequencies vibration.

Dr. Najim Mahmood Mohamad 2006: In the present work the Finite Prism method was used for the dynamic analysis of bridges under moving vehicles. In this process, using a combination of finite elements representing the cross section of the prism and the main aspect of Fourier in this work is the coupling of

technique of explicit solution of the equation of motion with the harmonic solution according to the method of finite prism to the problem of the moving vehicle, having thought that the dynamic interaction between the series appropriately chosen to represent the behavior of the prism inside the longitudinal direction, which satisfies simply supported boundary conditions at the ends. explicit time integration scheme was used to solve the equation of motion for each of the bridges and vehicles. In this depreciation of work has been overlooked in the formulation of the bridges movement equation. These make to prevent the solution of the global system of equations because each equation becomes uncoupled with other equations. One of the vehicles and a bridge. Keywords are used Bridge, dynamic interaction, Finite Prism, mobile forces, moving vehicles

Lupoi et al (2007) investigated the applicability of the GPA proposed by Chopra et al (2001) for the evaluation of a motorway viaduct built in the sixties, with a total length equal to 420m, with 11 bays each 33m and continuous reinforced concrete deck pinned on the waterfront. The differences between the nodal displacements estimated by AMP, and those of the non-linear analysis of historical time have proven to be of the order of 15%, regardless of the level of the ground motion intensity

Cardone et al (2007) use adaptive pushover analysis, called "adaptability spectrum" to reach two viaducts numbers simply supported in an Italian motorway network A series of fragility curves that describe. seismic vulnerability of the bridge under a probabilistic point of view has been reported as a result.

Muljati and Warnitchai (2007) evaluate the inelastic seismic response of multiple-span concrete bridges, using the modal pushover analysis (MPA). The performance of the study bridge using the AMP in a non-linear range, showed a similar trend with the MPA in a linear range. the MPA

results provided acceptable precision and more simplicity.

Shatarat et al (2008): Evaluation of the distinction within the international response deck with 2 nonlinear static analysis strategies (constant moving and spectrum capacity method)). The effectiveness of various nonlinear software packages from the system (GT-STRUDL version25, nonlinear SAP2000 Version seven.0, ADINA-node version of the 800) was evaluated. Among the software,

SAP2000 has provided higher results with the advantage of less complexness in the modeling and analysis. The technical capacity spectrum was saved advantageous over the technique of constant displacement, since it represents the behavior of the graphical structure.

Fu and Alayed (2008) oriented learning the relevance of a nonlinear static procedure, by implementing the methodology of constant displacement (DCM) in bridges. Accuracy and reliableness strategy was verified nonlinear analysis operation time history. a continuous span bridge 3 was analyzed for 2 levels of seismic intensity (level of design and thinking more about earthquake). The nonlinear static analysis gave conservative results compared to the non-linear analysis of the level look the history of time, then it has provided many conservative results at the most thought about earthquake .

ElGawady et al (2009) investigated the unstable performance of a reinforced concrete deck with basic pre hollow -stressed batteries, use of static and nonlinear dynamic analysis. a model 3 of the spine dimensions of the bridge was developed SAP2000 operation, as well as modeling of bridge supports, expansion joints, and the interaction of the ground structure. due to the effects of higher modes, the results obtained by nonlinear static analysis were found to be not comparable to those of the nonlinear dynamic analysis.

Rahai et al (2010): evaluated the unstable performance of 2 models of prestressed concrete bridges using the capability spectrum technique (CSM) and displacement constant technique (DCM). The displacement controlled pushover analysis was accustomed realize the capability of the structure. The DCM (which is suggested for buildings) results were found to be acceptable, and at an equivalent time additional conservative than the CSM results.

Shatarat and Assaf (2009): determined the seismic vulnerability of a multi-span-simply-supported prestressed bridge, so as to develop the desired retrofit live. The seismic vulnerability of the bridge was evaluated exploitation 2 seismic analysis ways, given within the federal route administration (FHWA) seismic retrofitting manual for route bridges, namely, methodology C and methodology D2.

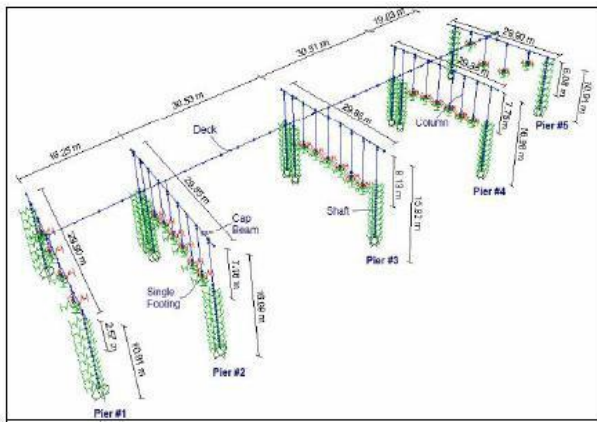


Figure:1 Spine model (Shatarat and Assaf 2009)

Dr. Mohamad Najim Mahmood 2006, : within the gift work the Finite Prism methodology was used for the dynamic analysis of bridges beneath moving vehicles. during this methodology a mixture is employed of the finite part methodology representing the cross section of the prism and Fourier main facet within the gift work is that the coupling of the express answer technique of the equation of motion with the harmonic answer victimization the finite prism methodology for the matter

of moving vehicle, taking into thought the dynamic interaction between the series befittingly chosen to represent the behavior of prism within the longitudinal direction, that satisfies the merely supported boundary conditions at the ends. express time integration theme was used for finding the equation of motion for every of the bridge and vehicle. within the gift work damping was neglected within the formulation of equation of motion of bridges. These render to avoid the answer of worldwide system of equations, as a result of every equation becomes unconnected with alternative equations. one in every of the vehicle and bridge. Keywords: Bridge, Dynamic Interaction, Finite Prism, Moving Forces, Moving Vehicles

Moni and Alam (2010): thought of many retrofitting provisions on 3 column concrete bridge bent in North American nation that was designed before 1965 with inadequate unstable description. because the bridge bent designed just for gravity load didn't meet the unstable standards, many retrofitting techniques like steel jacketing, CFRP jacketing and steel bracing were thought of to boost the unstable performance. The nonlinear pushover analysis was conducted for the first and retrofitted frames. a man-made ground motion record was wont to appraise the dynamic response of those structures. The unstable demand/capacity quantitative relation, drift quantitative relation, plasticity has been calculable. the simplest retrofitting technique has been projected for such multi-column bridge bents designed just for gravity load

3. Reserch methodology :

- Numerical study by finite element method (using ANSYS software)
 - Using ANSYS software analyzed the static, free and forced vibration.
- Comparing results with code.

4. Conclusion:

From the analysis of the bridge, the following conclusions and recommendations. Modal Bridge, the analysis, it was found that the modal bridge used in this research is harmonic transient is that gives the best result and positive and he also Validation of results with standard values [IS code]

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