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Human Structure Interaction in Moderately Flexible Structures

by

Professor John DOUGILL

Professor of Engineering Science, King's College, UK

and

Professor of Concrete Technology, Imperial College, UK

Date: October 23, 2006 (Monday)
Time: 5:30 – 6:30 p.m.
Venue: Lecture Theatre B, Chow Yei Ching Building
The University of Hong Kong

ABSTRACT

The conventional approach to calculating the response of structures under human loading is summarised and the conditions are established for which human structure interaction needs to be considered. Recent experimental research is summarised illustrating the occurrence of human structure interaction accompanying vertical rhythmic loading. A simplified human body/structure closed system is defined.

Simple human body models used in biomechanics are reviewed and modified to provide a self contained loading model to be used in a human body/ structure combination.

The properties of the idealised body unit are derived from experimental data together with the internal drivers required to generate motion.

A framework for analysis of human structure interaction is presented and the body unit used to estimate performance of simple structures over a practical range of frequencies. A simplified approach using equivalent damping, with the damping derived from the underlying human structure interaction theory is shown to be a useful approximation over a practical range of support structure natural frequencies.

Additional applications and areas for further study are discussed.

ABOUT THE SPEAKER

John Dougill is a Fellow of the Royal Academy of Engineering, Professor of Engineering Science at King's College London and Professor of Concrete Technology at Imperial College. He is a former Chief Executive and Secretary of the Institution of Structural Engineers and chairs the IStructE / DCLG / DCMS Joint Working Group. He is Visiting Professor in the University of Surrey and South China University of Technology.

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Dept. of Civil Engineering, The University of Hong Kong. Contact Tel. No.: 2859 2286