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Dynamic modeling of tall masonry structures and treatment of rocking motion (Conference Paper)

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Abstract

In this paper structures acted on by dynamic ground shaking and exhibiting a rocking motion are considered. The finite element analysis developed for an industrial chimney shows how this assumption is appropriate, when dealing with this type of structure, where the crack distribution helps to identify pivotal points, around which rotations occur. Modeling is then performed by moving to a distributional environment, where the problem may be set up in one unique formulation. This treatment is able to embed the impacts that occur during the motion at the pivotal points when sign changes occur in the rotation variable, and, moreover, to simplify and lighten the subsequent computational implementation. © Civil-Comp Press, 2015.

Author keywords

Dynamics; Finite element; Modeling; Pivotal points; Rigid structures; Rocking motion

Indexed keywords

Engineering controlled terms: Dynamics; Models; Rigid structures; Rotation
Computational implementations; Crack distribution; Ground-shaking; Industrial chimneys; Masonry structures; Paper structure; Pivotal points; Rocking motion
Engineering main heading: Finite element method

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Paper 143
Dynamic Modeling of Tall Masonry Structures and Treatment of Rocking Motion

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Keywords: rigid structures, dynamics, finite element, modeling, rocking motion, pivotal points.

Summary

In this paper structures acted on by dynamic ground shaking and exhibiting a rocking motion are considered. The finite element analysis developed for an industrial chimney shows how this assumption is appropriate, when dealing with this type of structure, where the crack distribution helps to identify pivotal points, around which rotations occur. Modeling is then performed by moving to a distributional environment, where the problem may be set up in one unique formulation. This treatment is able to embed the impacts that occur during the motion at the pivotal points when sign changes occur in the rotation variable, and, moreover, to simplify and lighten the subsequent computational implementation.

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