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# PILEDYN: a boundary element - finite element software package for PILE group linear DYNamic analysis

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This work presents the software package PILEDYN [1], which is a boundary element - finite element software package for pile group linear dynamic analysis. The software package comprises a pre-processor in MATLAB [7] using MESH2D [8] or gmsh [9] as meshing tools, a solver implemented in Fortran, and a post-processor also implemented in MATLAB.

The solver makes use of a Boundary Element Method (BEM) - Finite Element Method (FEM) coupling methodology adopted for soil-structure interaction problems for pile foundations [2]. It leads to a simplified but rigorous model for the interaction of one-dimensional structural elements (beams/piles) with infinite or semi-infinite continuous elastic media.

Piles are modelled using beam finite elements according to Euler-Bernoulli hypotheses, while the soil is modelled using boundary elements as a continuum, semi-infinite, isotropic, homogeneous or zoned homogeneous, linear, viscoelastic medium. Welded contact conditions at the pile-soil interface are assumed. The methodology allows studying problems including stratified soils with several layers, rigid rocky beds and any topography of the soil free-surface.

This model has been used in many soil-structure interaction problems such as the determination of dynamic stiffnesses [3, 5] and seismic response of pile foundations [3, 6] and piled buildings [4].

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