1. 個人資料

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2. SCI 期刊學術論文

Wang CJ, “Failure study of a bridge subjected to pounding and sliding under severe ground motions,” International Journal of Impact Engineering, Vol. 34 (SCI), 2007, pp.216-231.

Wang CJ, Shih MH, "Performance study of a bridge involving sliding decks and pounded abutment during a violent earthquake," Engineering Structure, Vol. 29 (SCI), 2007, pp.802-812.

Wang CJ, “Simulation of collision contacts among disjoined soil-structure bodies under seismic motions,” International Journal of Modern Physics B Part 2, Vol. 22 (SCI), 2008, pp.1544-1551.

3. 有限元素法之工程應用成果

土壤結構互制行為地震下動力分析-- 地下車站雙牆結構耐震論文研究

離散有限元素法動力分析程式-- DISMA9 code 簡介

User guide for DISMA9 code

A mixed-model approach to
transient solutions for dynamic systems consisting of
2D disjoined finite element regions and interfaces
(emphasizing dynamic soil-structure interaction)

1. Finite element model set-up

Processor	function
MODL2	2D auto-meshing
STBC2	material properties (elastic) boundary conditions (least possible) external loads (least possible) nodal numbering (disabled)
MNRO9	material properties (plastic) static analysis run (mandatory)
DSPL2	static analysis results (text only)
STBC2	remove boundary restraints where interface elements take over

(FE job data reserved at this stage for interfaces set-up)

2. Special processors for FE modeling:

(I) Substitute **DSPL2GRAPH** for DSPL2 for graphic display of FE geometry and analysis results.

(II) Gravity load and vibration frequency analysis—

(1) duplicate the model using **MODL2.**

(2) substitute **ST2BCOPTIM** for STBC2.

(2.1) prescribe boundary restraints to simulate at-rest soil condition.

(2.2) re-number the nodal numbers to minimize band-width of the stiffness matrix.

(3) run MNRO9 at least once.

(3.1) enable the gravity load analysis.

(3.2) follow on with **ST3DZ9** for frequency analysis.

3. Interfaces set-up

Processor	function
GRVFEM in FE soil regions	**at-rest soil stresses**
GAPELE on interfaces relating a FE boundary to base ground and to another FE boundary	**no-tension springs (non-slip gap) friction sliders (closed gap) no-tension dashpots (non-slip gap)**
GAPSPR on interfaces between a FE boundary and base ground or another FE boundary	**elasto-plastic springs (kinematic hardening)**
INIFEM in FE regions	**initial movements (at time=0) constrained movements (all times)**
CONFEM on interfaces between a FE boundary and another FE boundary	**contact elements (gap open/close/slip)**

4. Other utilities for interfaces with FE models–

BARFEM
Smeared reinforced bars material in FE concrete region

GAPFEM
Transition elements to cross compatible (disjoined) FE boundaries

IMPFEM
Impulsive load applied to FE boundary

BUKFEM
Contact stiffness based on bulk modulus

ST3DZ9
Element having smallest size
Element having largest aspect ratio
Element having highest natural frequency
Time step size according to frequency
Time step size according to wave speed
Time step size according to contact stiffness

5. Discrete mass system set-up

Processor	function
MASIN	
for each mass particle	**mass value** **dashpot** **initial condition**
on interfaces between a mass and another mass or base ground	**no-tension springs** **no-tension dashpots** **friction sliders** **elasto-plastic springs** **initial conditions**
base ground excitation	**accelerations (horizontal/ vertical/ both)**

6. Special codes used to evaluate soil and concrete behaviors

RECMK1 and CIRMK1

Elasto-plastic moment-curvature analysis for reinforced concrete section

SHAKE9

Elasto-plastic 1D shear-beam model for ground shaking analysis

HOMOG

Homogenized elasto-plastic model for reinforced concrete section

SOILPR

Multi-layered active/at-rest/passive soil pressure loading analysis

BACKWA

Push-over analysis using soil-springs for abutment-backfill

PASIFAL

Passive failure analysis of backfill by sliding block theory