

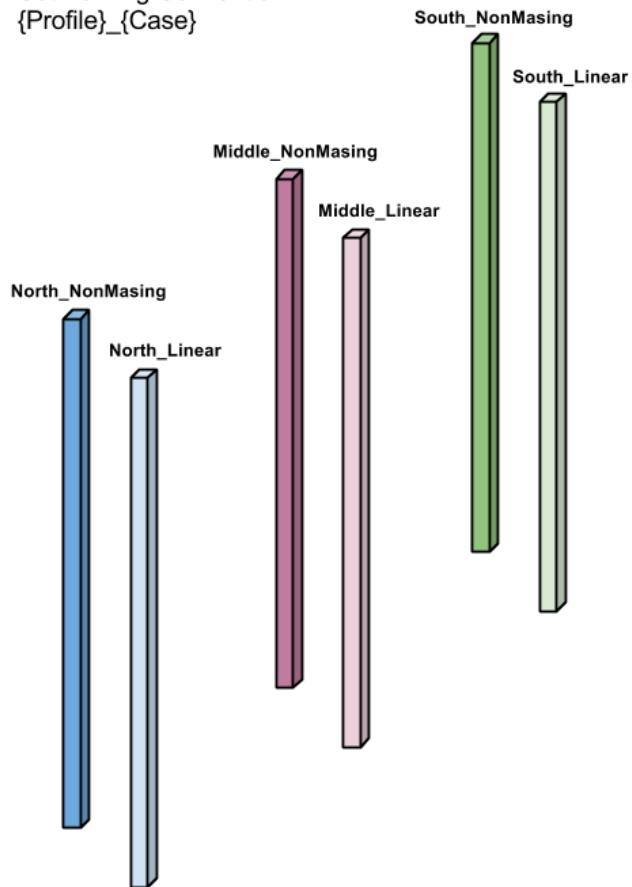
Pre-processing

A. Setting up Dyna model ...

1. Create soil column(s)
 - a. Open “blank.key” in PRIMER
 - b. Go to “Script” → Open “layer_create_version_2.js” → Run
 - c. Select “DYNA_Model_Data.csv” and follow prompt
 - d. Remove original blank part
 - e. Create SET_PART which contains all soil layers
 - f. Apply DEFINE_STAGED_CONSTRUCTION to the SET_PART defined earlier. Keep all parameters at 0.
 - g. Set INITIAL_PWP_DEPTH for SET_PART defined earlier.
 - h. Set INITIAL_STRESS_DEPTH for SET_PART defined earlier, apply the horizontal and vertical stresses.
 - i. Set BOUNDARY_PORE_FLUID with ATYPE = 1
 - j. Reorient all nodes if needed (i.e. if you will be merging multiple soil columns and do not want them to overlap)
 - k. If want to use “NonMasing” material
 - i. Go to “Include”, go to the arrow by the model name, hover over the arrow next to “Add child” and selected “*INCLUDE”
 - ii. Click folder icon and write name you want (e.g. “Delete.key”)
 - iii. Click “OK” to creating empty include file
 - iv. Go to MATERIAL → “Keyword”
 - v. Select all soil materials (should be all but the last, which is a damper)
 - vi. Move from “Main” model to the empty include file you just created (e.g. “Delete.key”)
 - l. Write model
 - m. In Vim, include Damping, Strength, and Material key files (as created from the spreadsheet)
 - n. Repeat as needed to create all columns of interest
 - o. Merge soil columns as needed – be sure to use “Check” when merging and avoid clashing of ID’s
 - p. Loading should be input as velocities (in m/s) as LC1001 (x), LC1002 (y), and LC1003 (z)

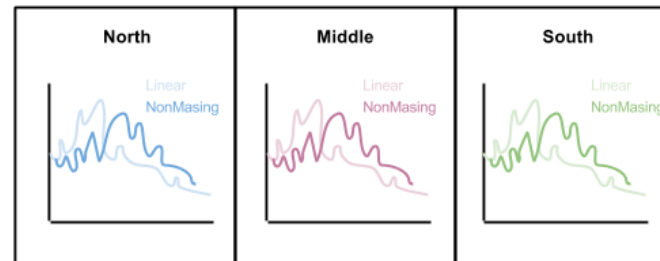
2. Create node sets and solid sets for post-processing (see image below)
 - a. For each column, create a node set called $\{\text{PROFILE}\}_{\text{CASE}}$ that includes a surface node and a base node
 - b. For each column, create a soil set called $\{\text{PROFILE}\}_{\text{CASE}}$ that includes all solids in the column
 - c. Be sure to report these in DATABASE_HISTORY_NODE and DATABASE_HISTORY_SOLID

Set Naming Convention:
 $\{\text{Profile}\}_{\text{Case}}$



Resulting Figures:

- Subplot for each profile
- Each case for a given profile on same subplot



B. Running Javascripts to create csv files ...

1. Go to “Script” and click on the yellow folder icon. Locate “PRE_sets.js”.
If you’re running it out of my transfer drive, the file location is: *T:\S-F\Nicole Paul\Javascript\1_Pre-PRIMER*
2. Click “Run”
3. Click “Select Output CSV Directory” and choose where you would like your CSV’s to be output. You should choose the directory in which your THF files are saved
4. Click “Nodes” and select all node sets that you want to post-process.
5. Click “Solids” and select all solid sets that you want to post-process.
6. Click “Exit”
7. In the CSV directory chosen earlier, there should now be two CSV’s called “req_node_sets.csv” and “req_solid_sets.csv”

C. Setting up directories for post-processing ...

1. For each model run that you will be post-processing, copy the “req_node_sets.csv” and “req_solid_sets.csv” files over to those directories
2. If you will be comparing to recorded data, put csv files of the format shown below in each directory

File Name: “recorded_rs_{STATION}.csv” (e.g. recorded_rs_tsx1.csv, recorded_rs_tsx2.csv for stations TSX1, TSX2)

T	RSx	RSy
0	0	0
0.01	0.40	0.60
...

3. If you will be using outcrop data, put the velocity (m/s) time histories in with file names “outcrop_x.csv” and “outcrop_y.csv” in each directory. These should be two columns where the first column is time and the second column is the outcrop velocity in that direction. No headers are expected.

Post-processing

A. Running Javascripts to create csv files ...

1. Recommend to first transfer the THF and BIN files to an external hard drive or your local drive first
2. Open T-HIS
3. Go to “Javascript”
4. Increase Memory from 25 to some large number (e.g. 500)
5. Click the yellow folder icon. Locate “node_TH.js”
If you’re running it out of my transfer drive, the file location is: *T:\S-F\Nicole Paul\Javascript\2_Post-THIS*
6. Click “Run”
7. Wait until the command window says “SCRIPT COMPLETED”
8. In “Javascript”, click the yellow folder icon again. Location “solid_TH.js”
If you’re running it out of my transfer drive, the file location is: *T:\S-F\Nicole Paul\Javascript\2_Post-THIS*
9. Click “Run”
10. Wait until the command window says “SCRIPT COMPLETED” before closing.

All CSV’s will be saved in the same directory as your THF file.

B. Using Matlab GUI ...

Open GUI by typing in `>> PPGUI_build;`

1. Choosing directory...

Directory for suite of runs
Subdirectory for each model run (e.g. for each ground motion)

2. Check requested figures

3. Check if outcrop (rather than infield bedrock) should be used for spectral amplification calculation

4. Check if there is recorded data to compare results to

5. Select units for figures

6. Click "Generate Figures"

The diagram illustrates the workflow for using the ARUP SRA Post-Processor GUI. On the left, a file explorer shows the directory structure: SRA_GUI, .git, Outcrop, Presets, Results (containing AV-noDampers, 990615, and 990930), and storage. The AV-noDampers folder is highlighted as the 'Directory for suite of runs', and the subfolders 990615 and 990930 are highlighted as 'Subdirectory for each model run (e.g. for each ground motion)'. On the right, the ARUP SRA Post-Processor GUI is shown. The 'Time History Data' section has checkboxes for Surface Acceleration, Surface Velocity, Surface Displacement, Bedrock (Outcrop) Acceleration, and Bedrock (Outcrop) Velocity. The 'Response Spectrum Data' section has a 'Damping' input (0.05) and checkboxes for Surface Acceleration, Bedrock (Infield) Acceleration, Bedrock (Outcrop) Acceleration, Spectral Amplified (Surface/Bedrock), and Surface Displacement. The 'Peak Profile Data' section has checkboxes for Shear Strain and Shear Stress. The 'Hysteresis Data' section has a 'Specified Layers' checkbox and a 'Select directory' button. The 'Legend Names' section has a table with columns for Folder, Color, and Line Type. The 'Response Spectrum Calculations' section has checkboxes for Mean, Max, Mean +/- # St. Dev., Major, and Geomean. The 'Bedrock Information' section has a 'Use Outcrop' checkbox and a file path input. The 'Recorded Information' section has checkboxes for Recorded Spectral Amplification and Recorded Surface Acceleration. The 'Unit Conversions' section has dropdowns for Acceleration (g), Velocity (cm/s), Displacement (cm), and Stress (kPa). The 'Generate Figures' button is highlighted with an arrow pointing to it from step 6.

Get latest version of MATLAB GUI at: https://github.com/nicolepaul/Arup_SRA