



AD FALCON API Manual

Demosntartive Examples of Pre- scribing Displacement

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1 Demosntartive Examples of Prescribing Displacement

1.1 File Names

- [fem_prescribed_displacement_ramp.txt](#)
- [fem_prescribed_displacement_tabular.txt](#)
- [fem_prescribed_displacement_sinusoidal.txt](#)

1.2 FEM Model Setup

The geometry and boundary conditions and other analysis properties remain the same as described in [Example 1](#).

1.2.1 Prescribed Displacement Cases

Case 1: Ramp Displacement ([details](#)) The prescribed displacement is applied as a ramp load over the simulation time:

```
@PrescribedValue Displacement 1
@@DOF: DisY
@@Amplitude: -0.4
@@LoadType: Ramp
@@StartStep: 1
@@NodeIds: 815 814 813 812 811
@@Propagate: FinalStep 1
```

Case 2: Tabular Displacement ([details](#)) A tabular data approach is used to define non-linear prescribed displacements:

```
@PrescribedValue Displacement 1
@@DOF: DisY
@@Amplitude: -0.4
@@LoadType: Tabular
@@TabularData: 0 0; 50000 0.1; 70000 0.7; 100000 1.0
@@NodeIds: 815 814 813 812 811
@@Propagate: Yes
```

Case 3: Sinusoidal Displacement ([details](#)) The prescribed displacement follows a sinusoidal pattern over the simulation time:

```
@PrescribedValue Displacement 1
@@DOF: DisY
@@Amplitude: -0.4
@@LoadType: Sinusoidal
@@Frequency: 1e-5
@@PhaseLag: 0
@@StartStep: 1
@@NodeIds: 815 814 813 812 811
@@Propagate: FinalStep 1
```

1.3 Results

1.3.1 Comparison of Stress at the Center of the Footing

The stress at the center of the footing is analyzed for all cases:

- **Ramp Displacement:** Uniform stress distribution over time.
- **Tabular Displacement:** Linear segments in stress evolution in response to tabulated input.
- **Sinusoidal Displacement:** Oscillatory stress response matching the sinusoidal input.

Figure 1. Stress at the center of the footing vs time for all displacement cases.

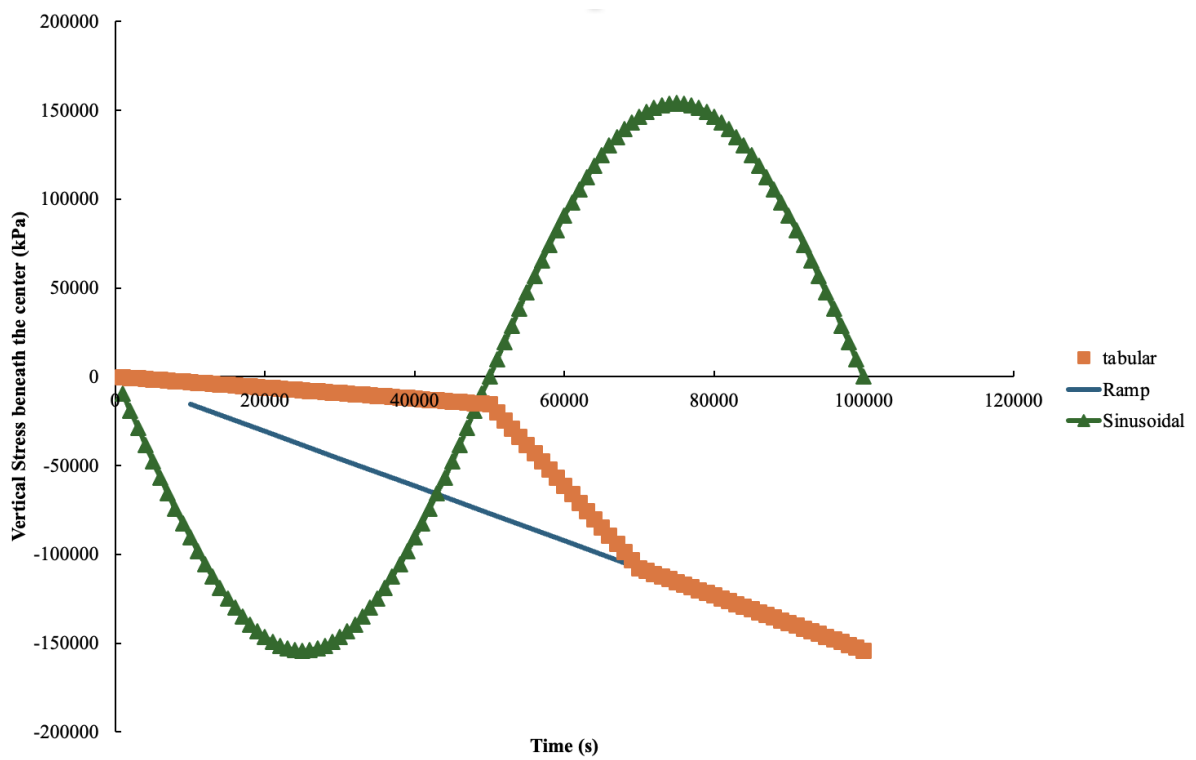


Figure 1: Figure 1: Fnorm vs Step of Analysis