AD FALCON API Manual

Infinite Elements for Far-Field Truncation (Fully Coupled Consolidation)

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Contents

1 Infinite Elements for Far-Field Truncation (Fully Coupled Consolidation)

1.1 Problem Description

This example demonstrates **mapped infinite elements** for truncating an unbounded domain in a plane strain **fully coupled** consolidation analysis (solid + pore water + pore air, i.e. `PL FullyCoupled`).

What is compared (same loading and material in all cases): - A **2×2 m** domain with **infinite elements** on the left/right/bottom (small near-field model) - A **2×2 m** domain with **fixed truncation boundaries** (small truncated) - A **4×4 m** domain with **fixed truncation boundaries** (medium truncated) - An **8×8 m** domain with **fixed truncation boundaries** (large truncated reference)

1.2 Model Setup

1.2.1 Analysis Type

```
% AnalysisType
PLFullyCoupled
%%%
```

1.2.2 Consolidation Outputs

For postprocessing, this example writes results **every sub-step**:

```
@@OutputControlType: ByStep
@@OutputControlValue: 1
@@OutputTypes: Displacement EffStress PW EXPW PA EXPA VoidRatio
```

1.3 Infinite Element Configuration

Infinite elements are attached to the left, right, and bottom boundaries of the **small** domain:

```
% Infinite Elements
@Boundary Left
  @@Type: TRI6
  @@Topology: Strip
  @@Material: Mat1
  @@Nodes: ...
  @@ExteriorPoint: ...
```

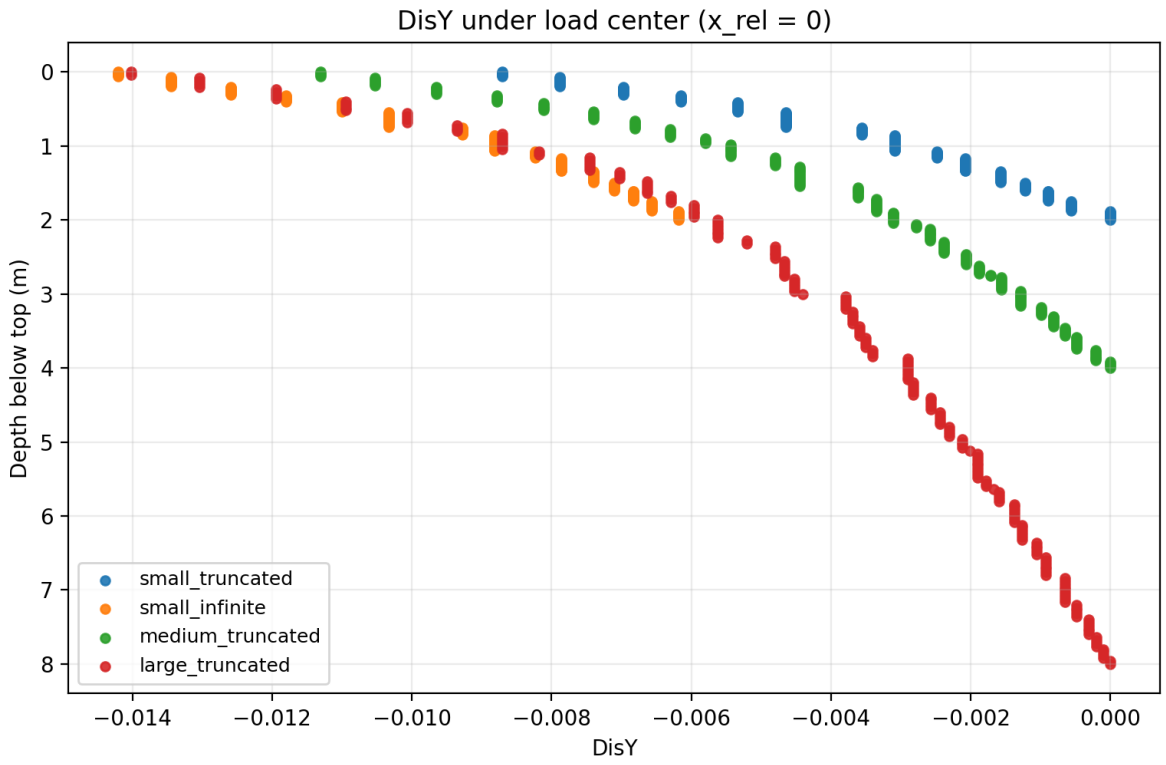

Figure 1: Settlement at load center

```
  @@InteriorPoint: ...
  @@RayLength: ...
  @@ApplyInfinityBC: Yes
  @@ApplyInfinityBCPW: Yes
  @@ApplyInfinityBCPA: Yes
  @@PW: 0.0
  @@PA: 0.0
%%%
```

1.4 Results

1.4.1 Settlement Profile at Load Center

1.4.2 Settlement Profile at Footing Edges

1.4.3 Displacement vs. Horizontal Position at Depth

1.4.4 DisY Evolution During Consolidation

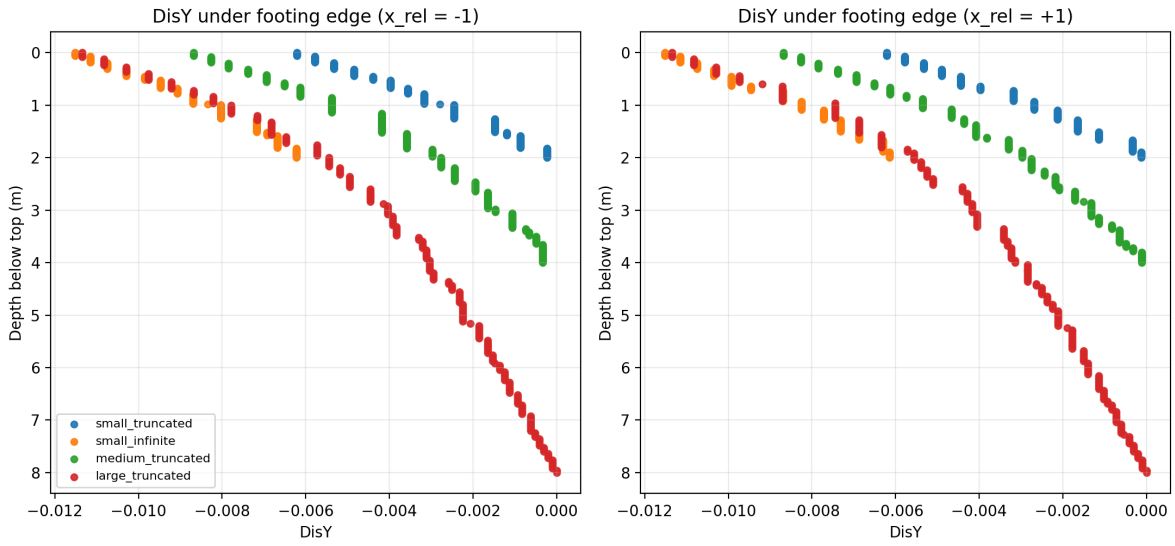

Figure 2: Settlement at footing edges

1.5 Input Files

- Small domain with infinite elements
- Small truncated domain
- Medium truncated domain
- Large truncated domain (reference)

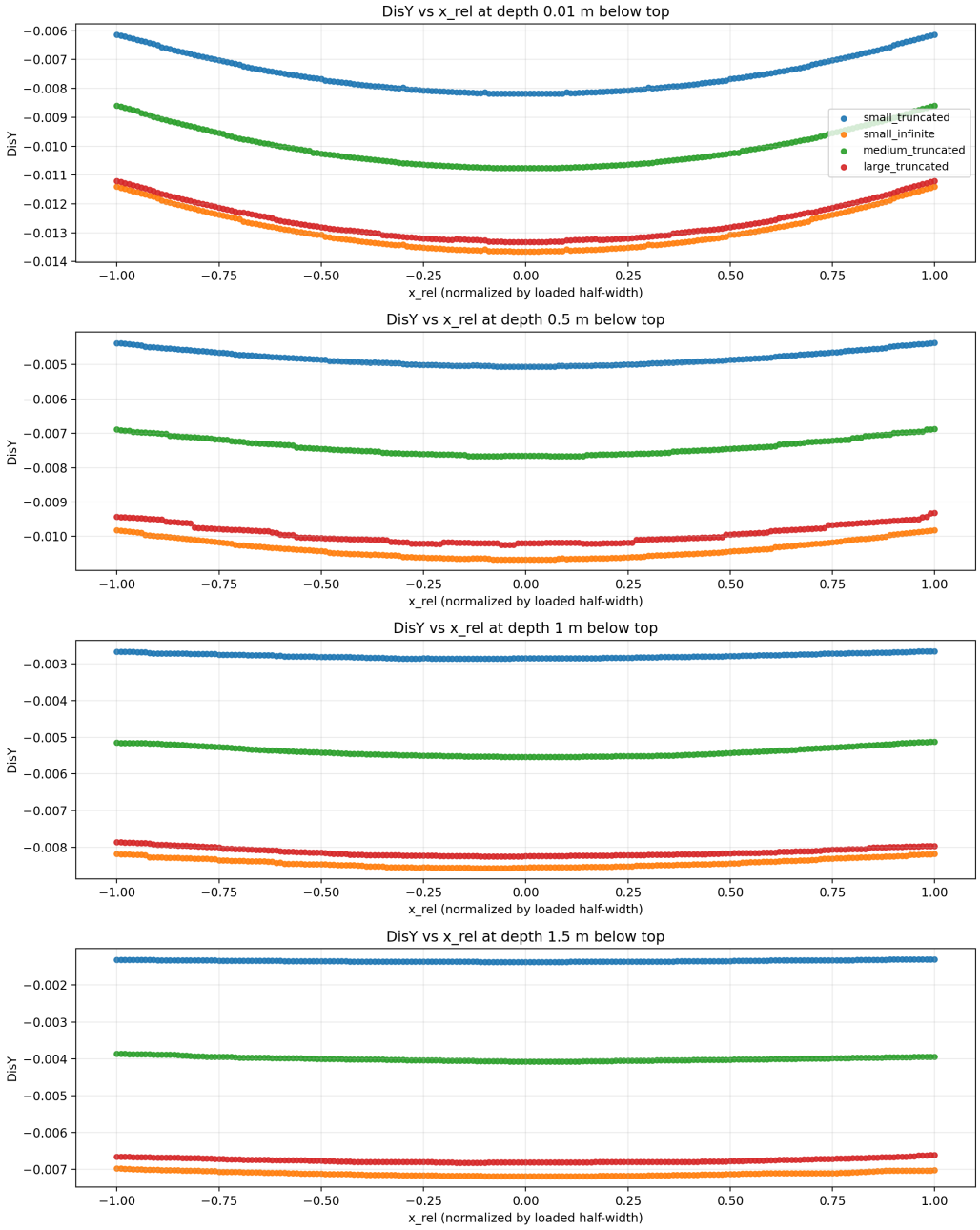

Figure 3: Displacement at various depths

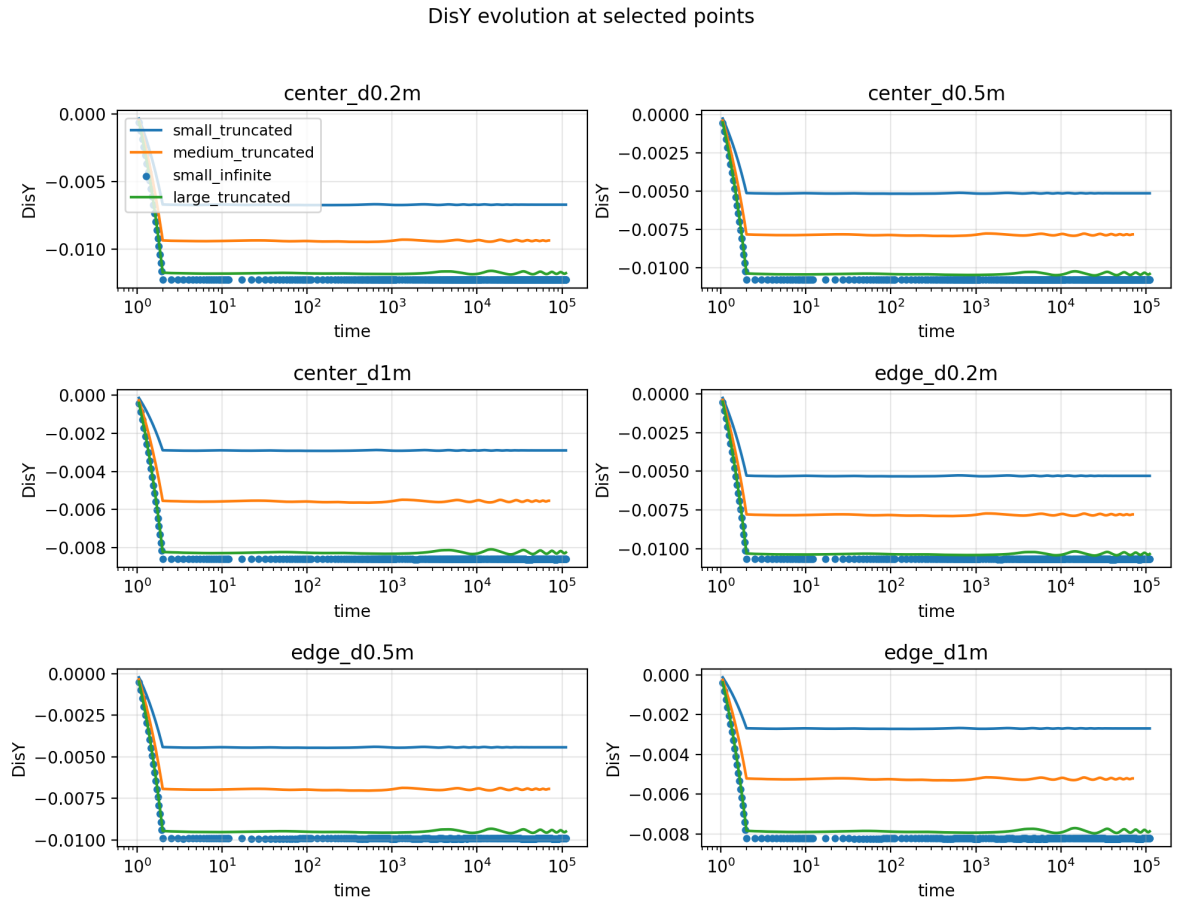

Figure 4: DisY evolution