Macro-Elements for Soil-Pile Interaction in Liquefied Soil

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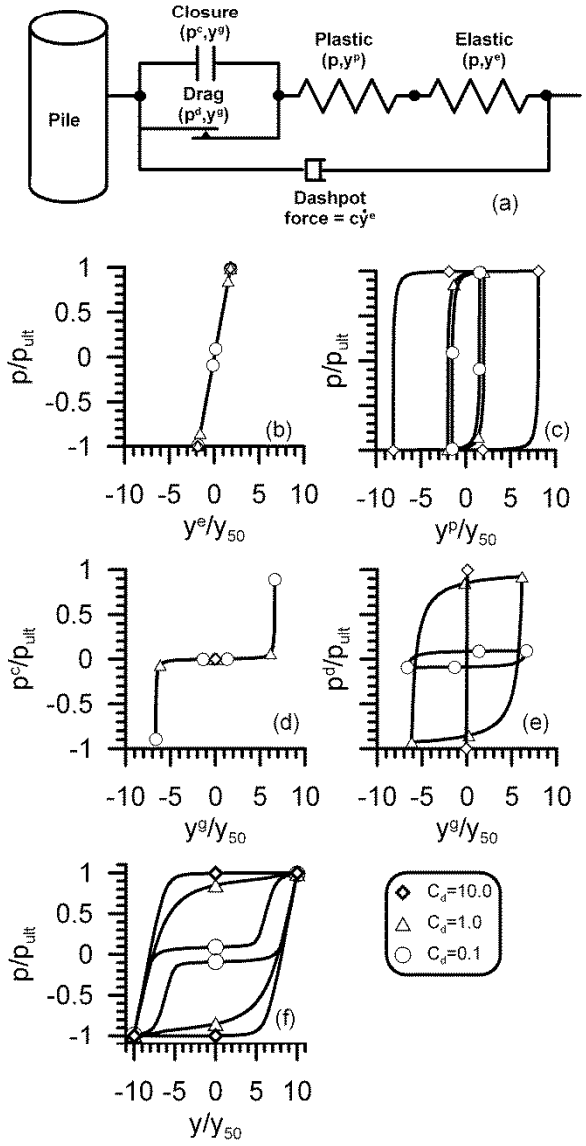
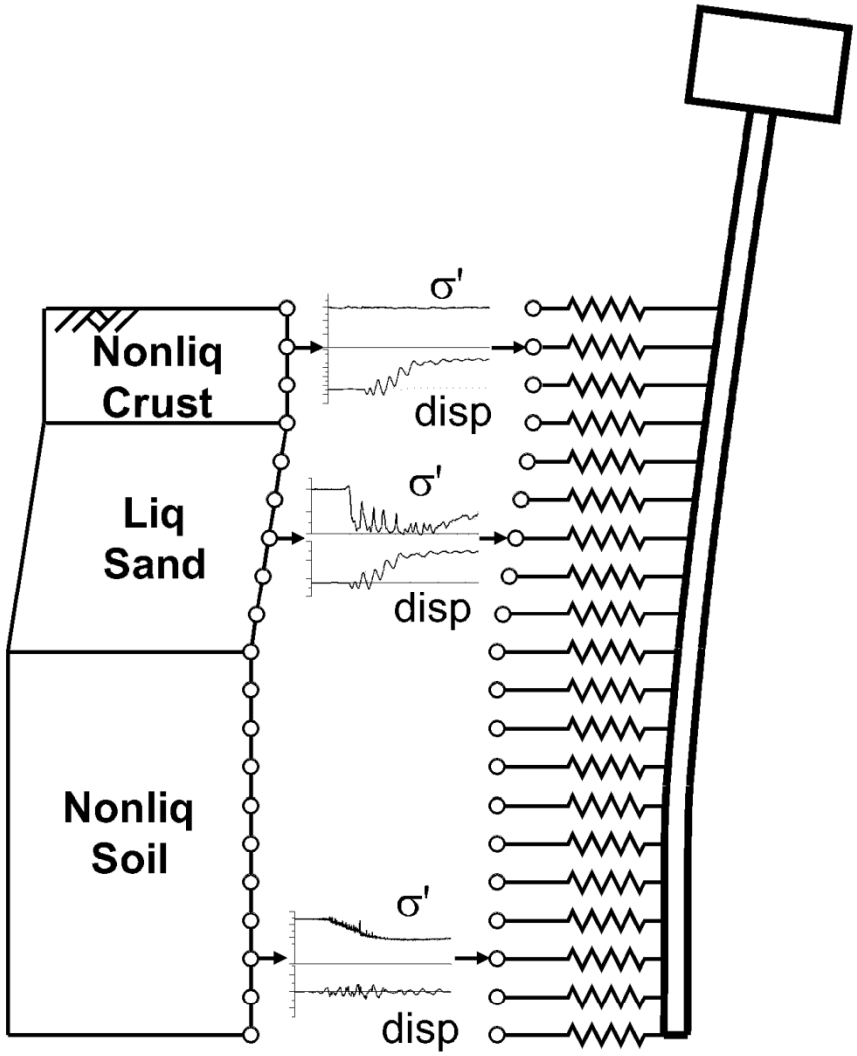
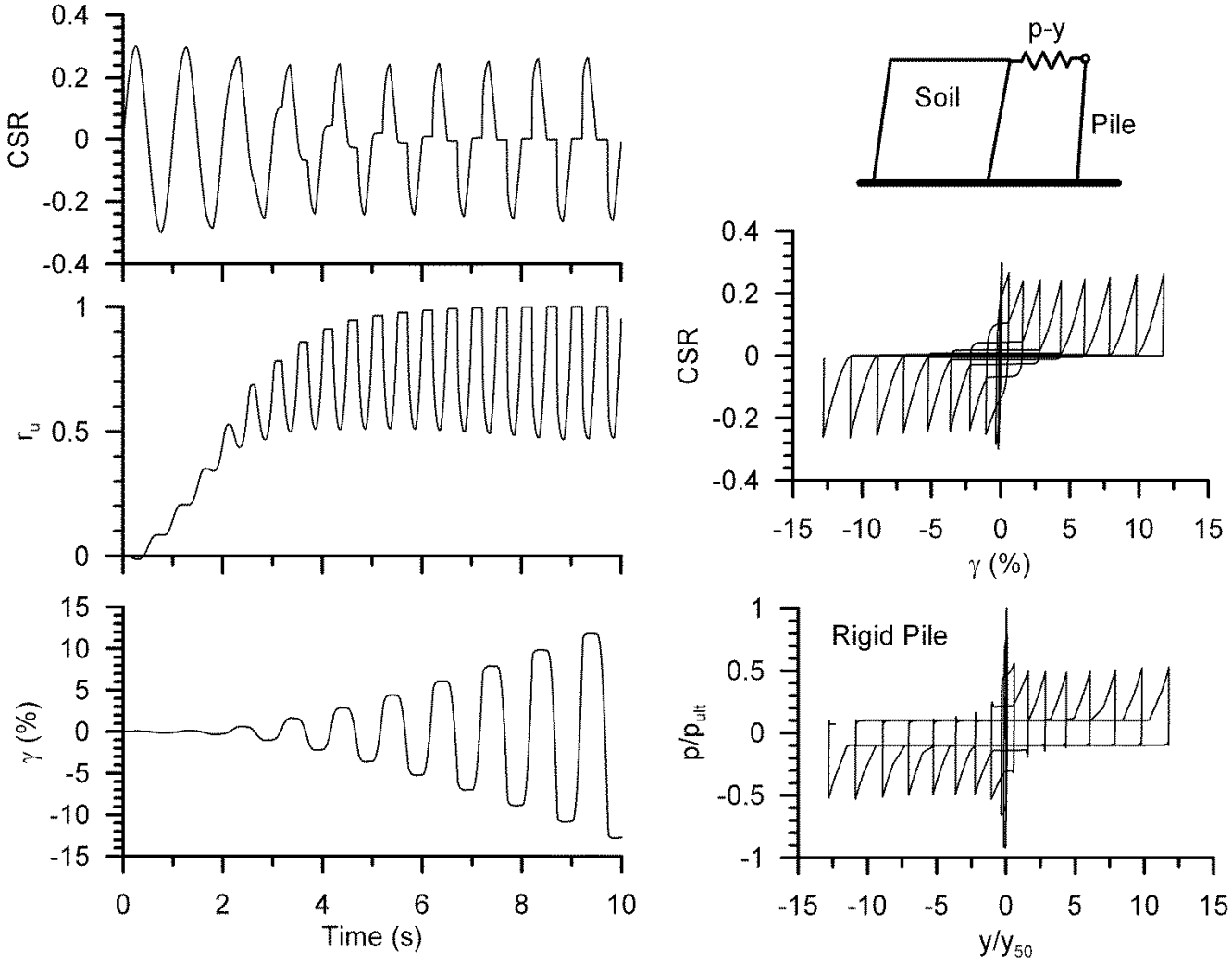
PySimple1 uniaxialMaterial formulation



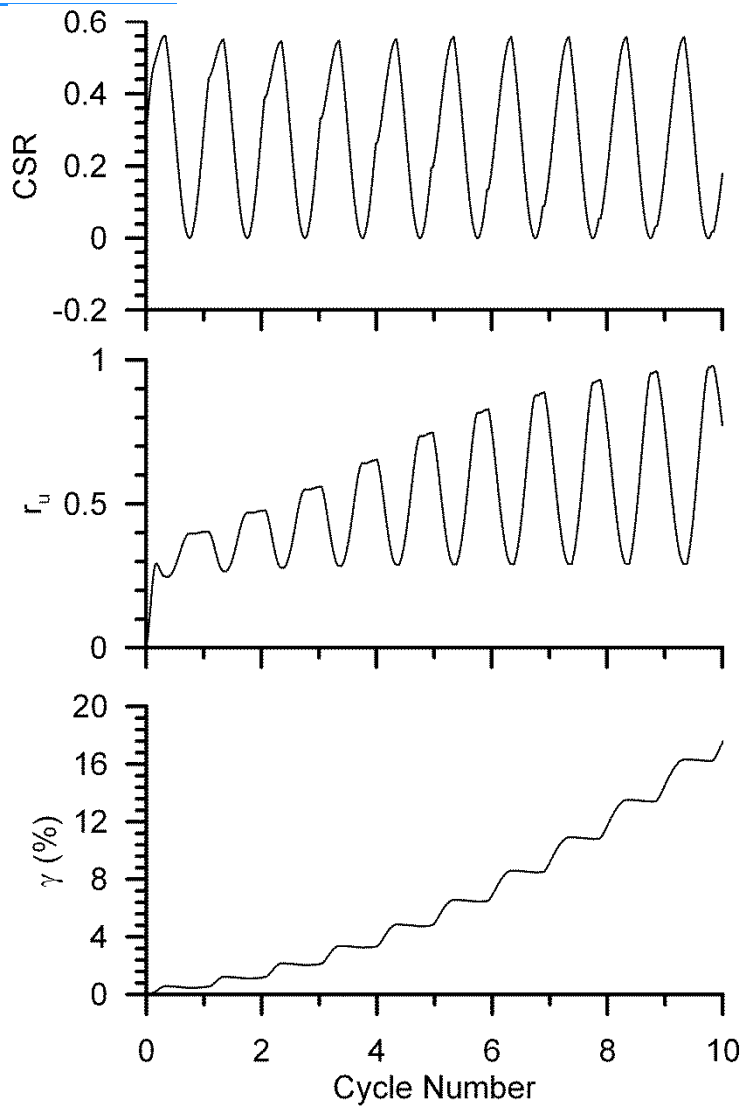
PyLiq1 uniaxialMaterial formulation

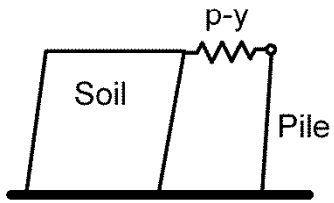


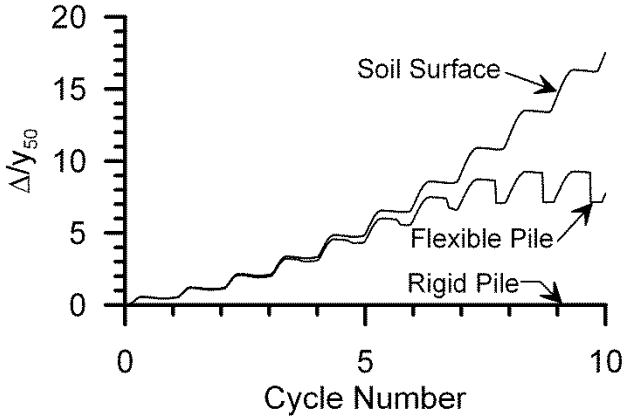
Example Analysis Without Lateral Spreading

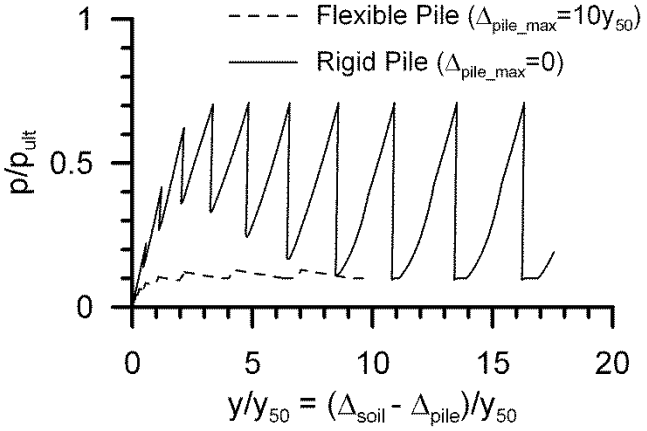


Example Analysis with Lateral Spreading

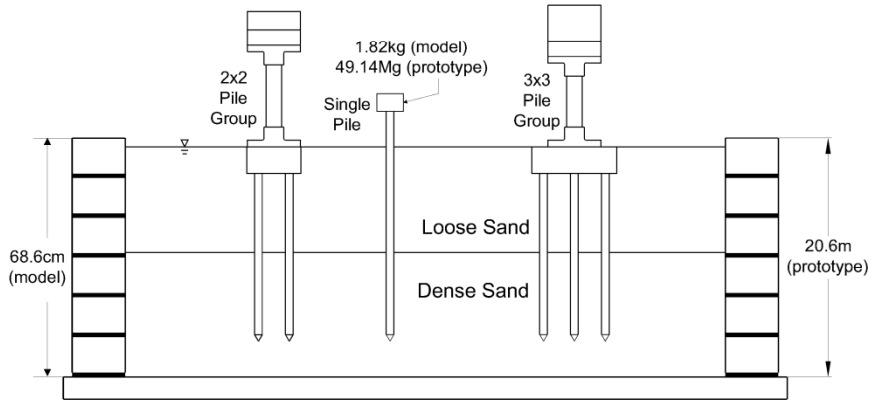




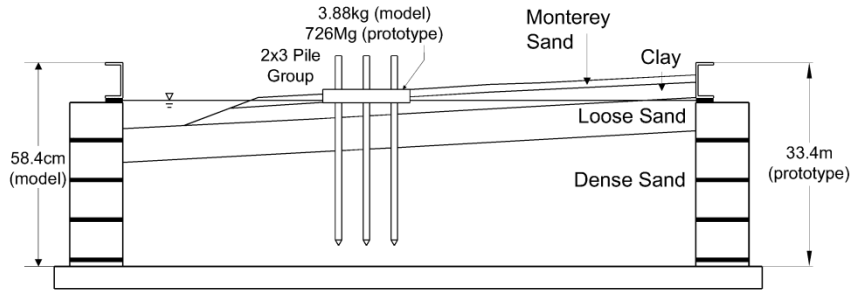




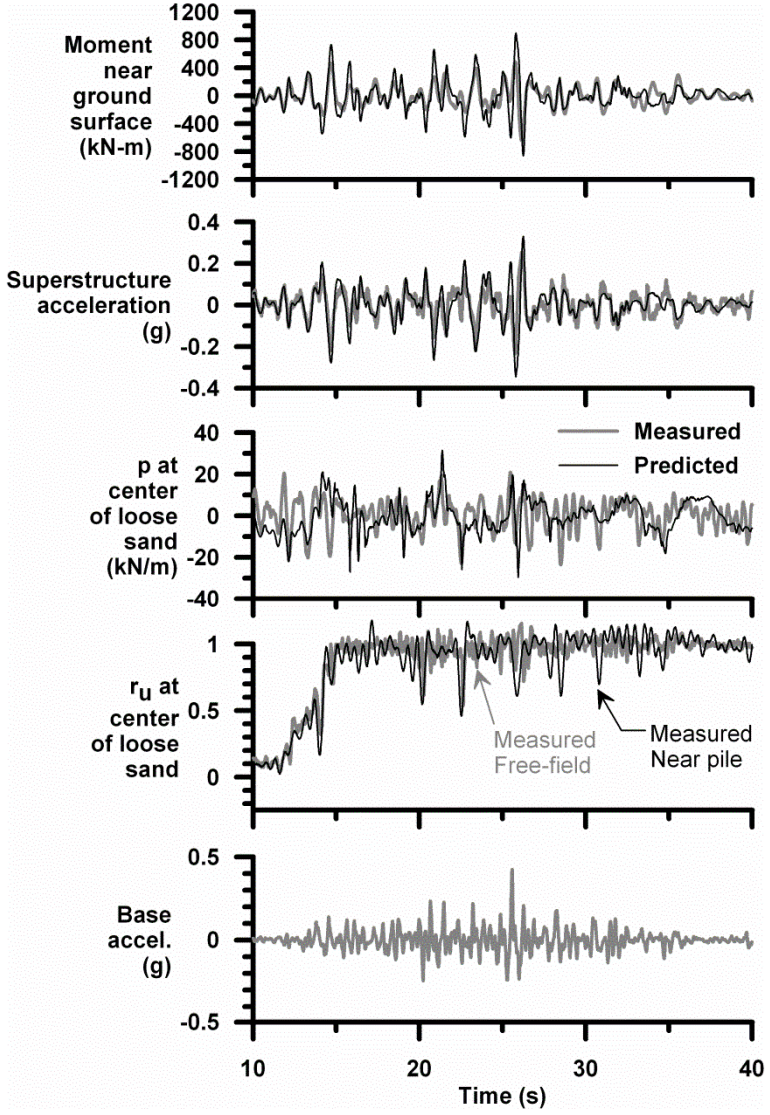
Centrifuge Modeling Comparison



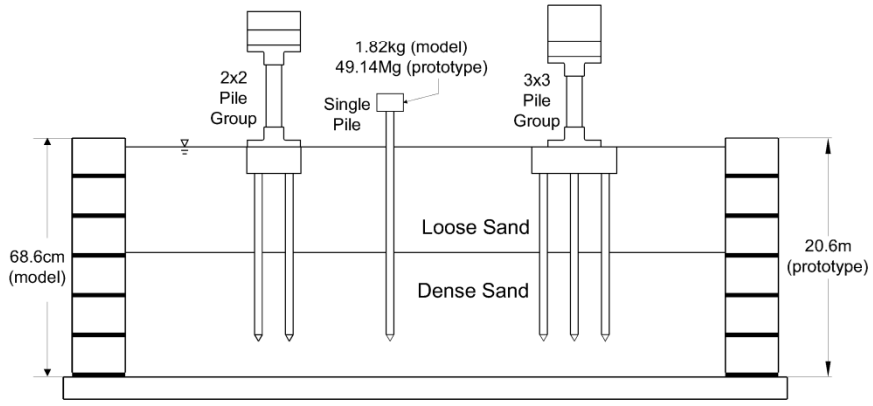
(a) CSP2



(b) SJB03



Centrifuge Modeling Comparison



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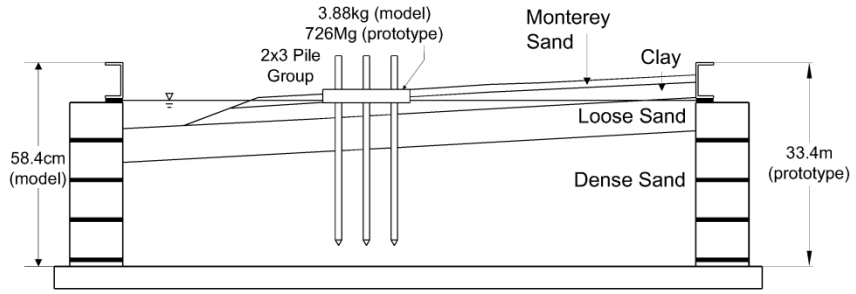
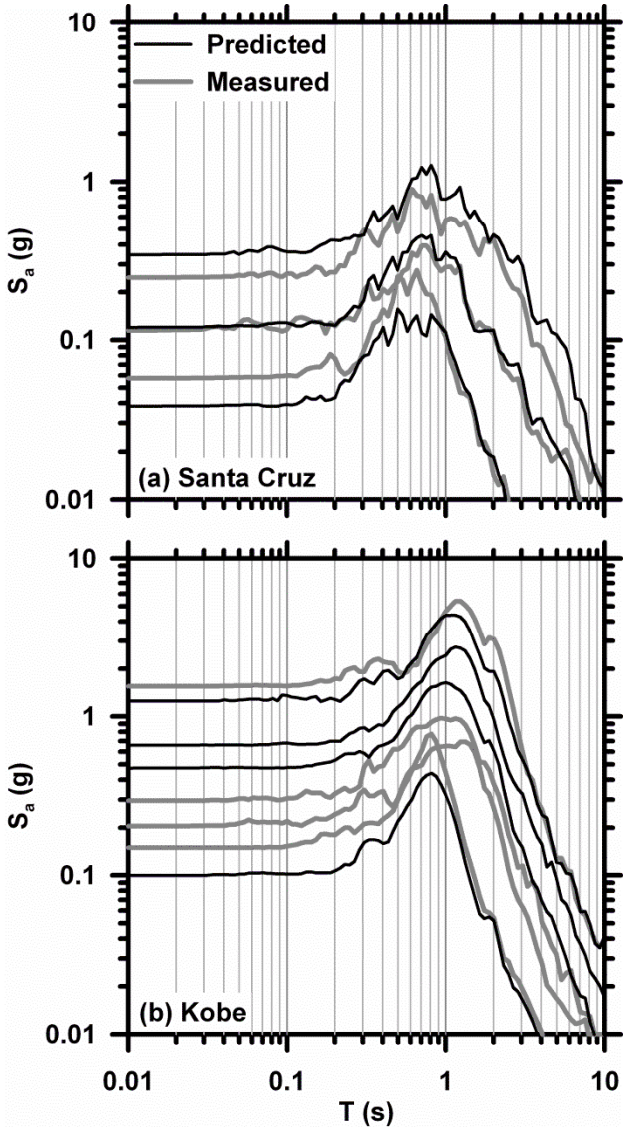
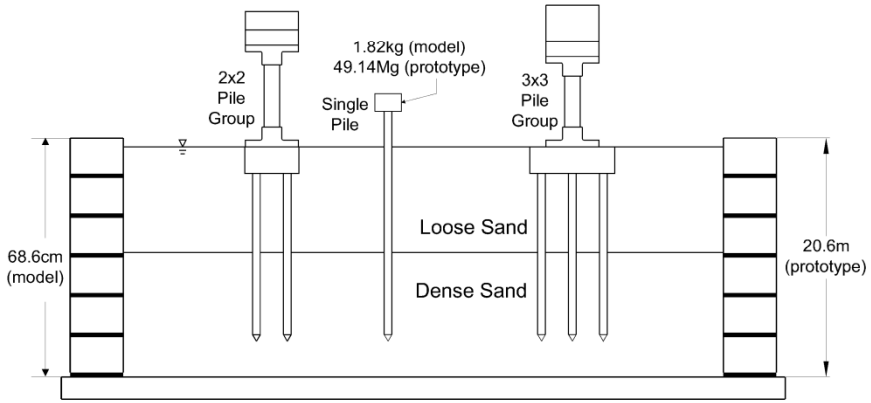


(b) SJB03



Centrifuge Modeling Comparison



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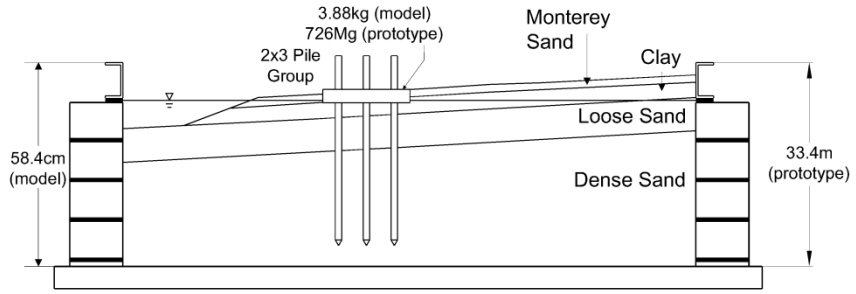
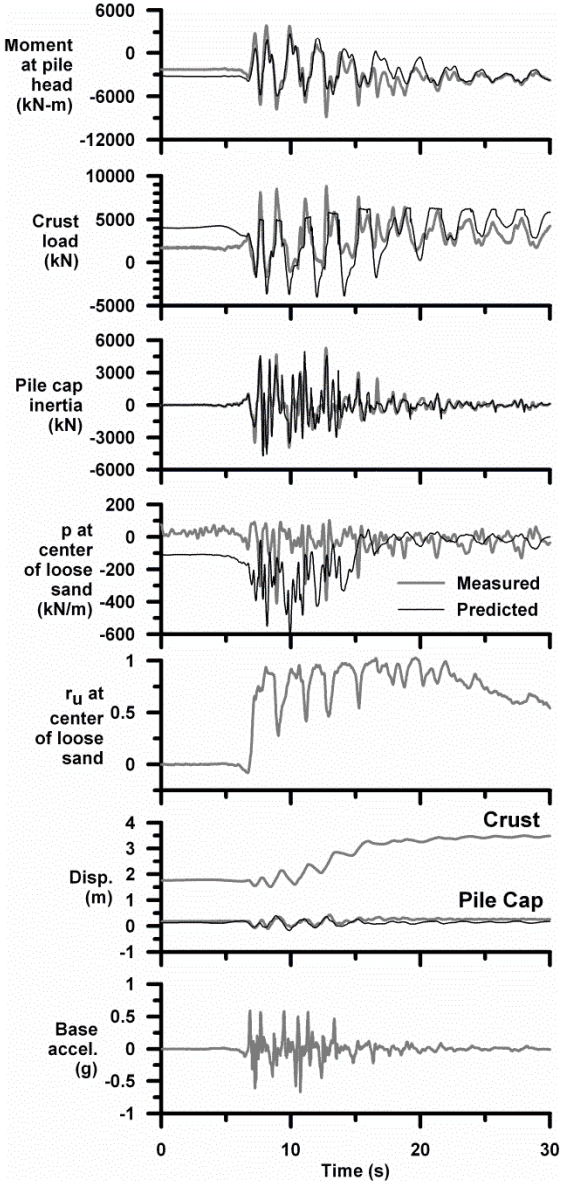
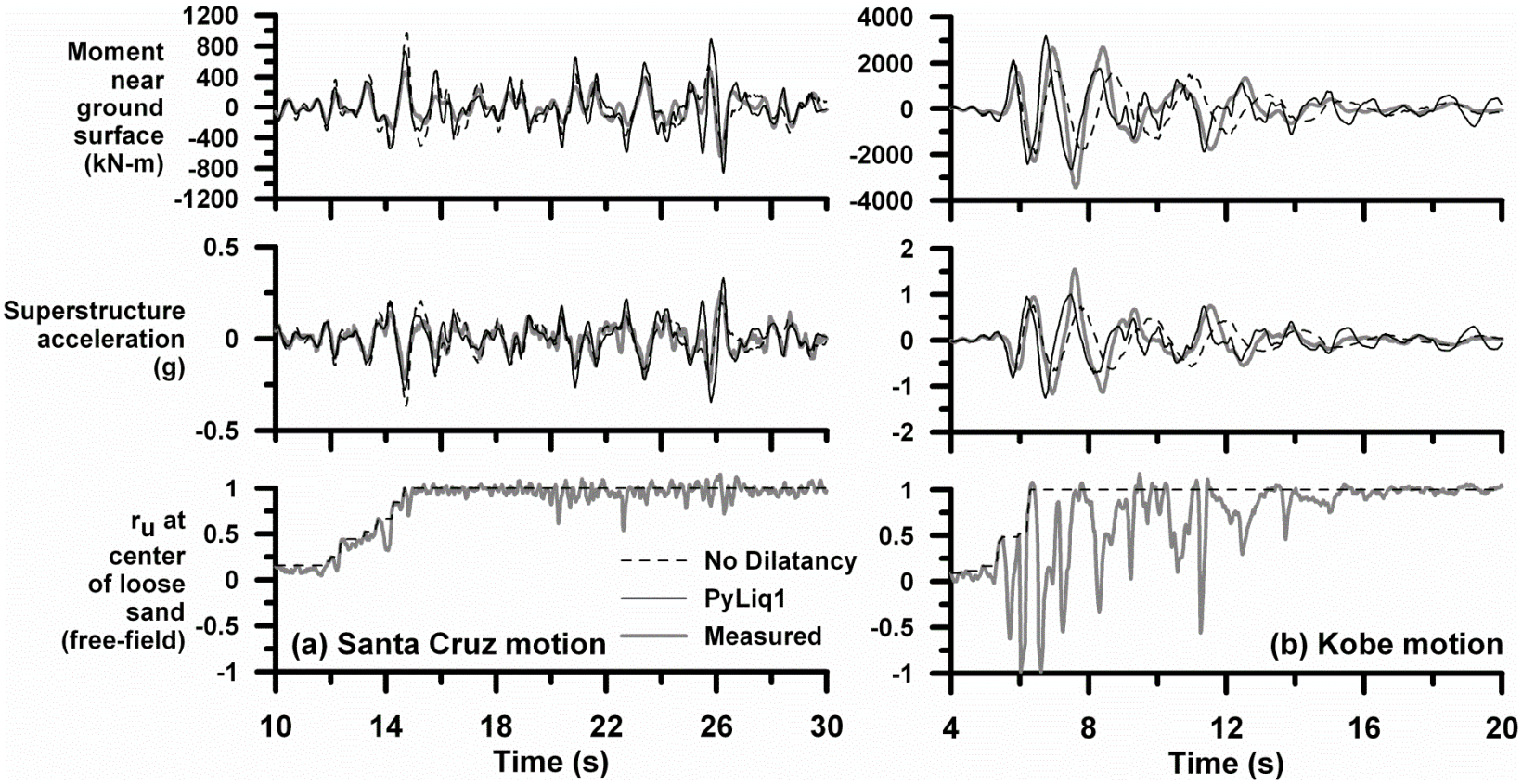


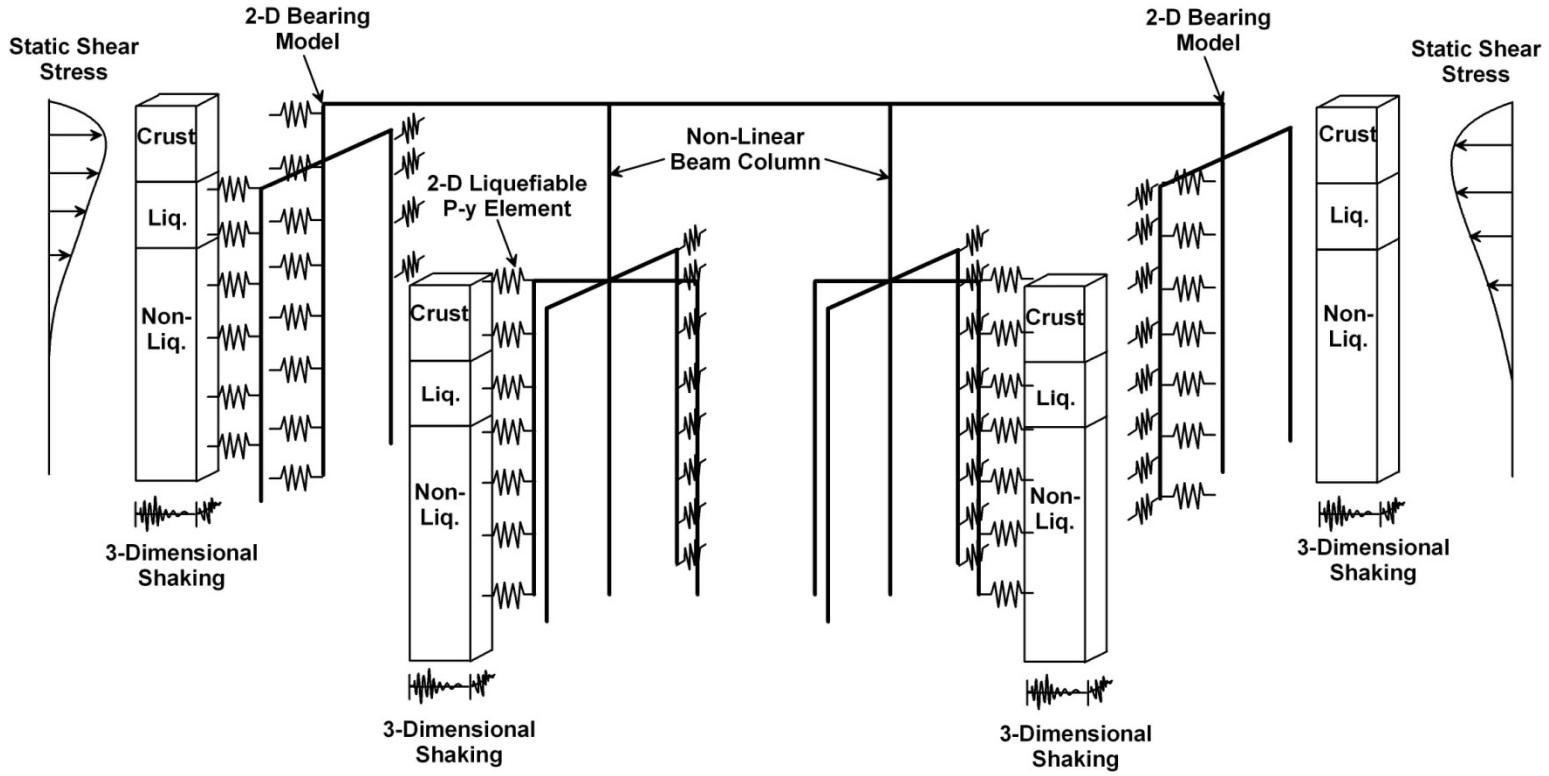
(b) SJB03



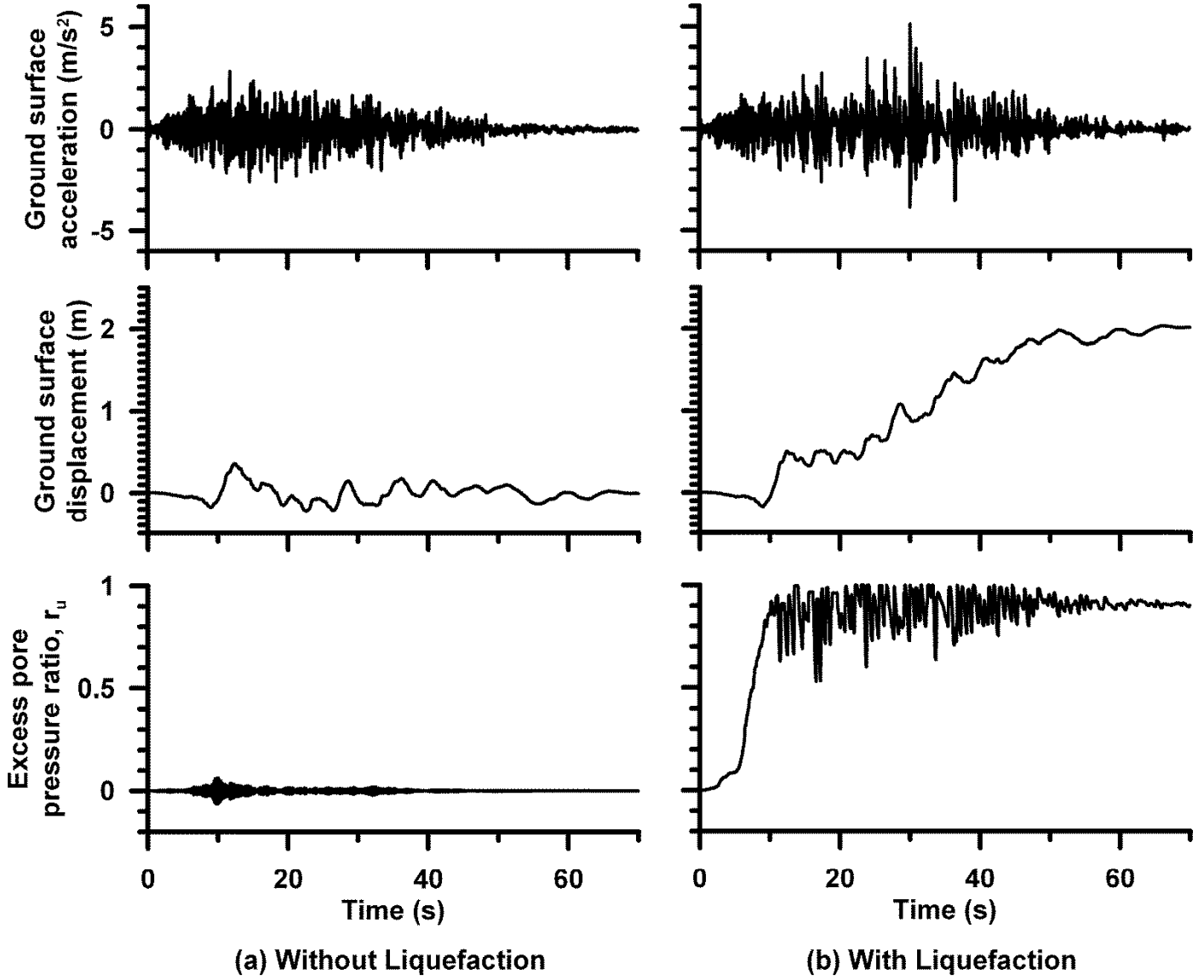
Influence of Dilatancy



3-D Global Dynamic Analysis



Site Response Analysis



Non-Liquefaction Case

Earthquake Duration 60s
3D View, Scaling by 10

Liquefaction Case

Earthquake Duration 60s
3D View, Scaling by 10

Conclusions

- **Calculations using the PyLiq1 materials compared reasonably with centrifuge test measurements.**
- **Dilatancy and the associated drops in pore pressure during undrained loading is important for laterally loaded piles in liquefiable soil.**
- **Simplified global dynamic simulations can be performed using the PyLiq1 materials.**