

Yield behavior of sand under generalized stress conditions

P.J. Naughton

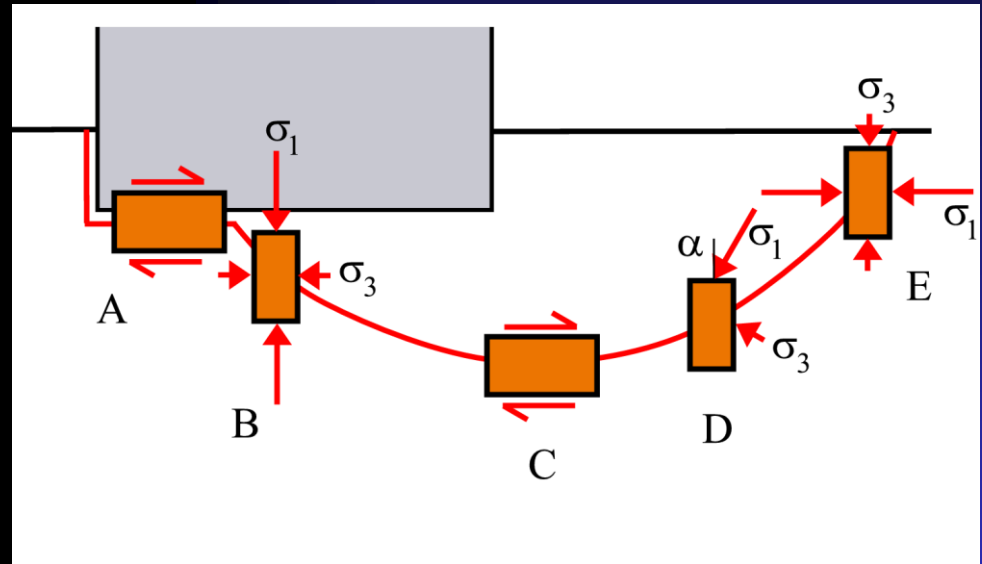
Institute of Technology, Sligo, Ireland

Brendan C. O'Kelly

University of Dublin, Trinity College, Ireland

Introduction

Yielding of
soil foundation



Matsuoka-Nakai

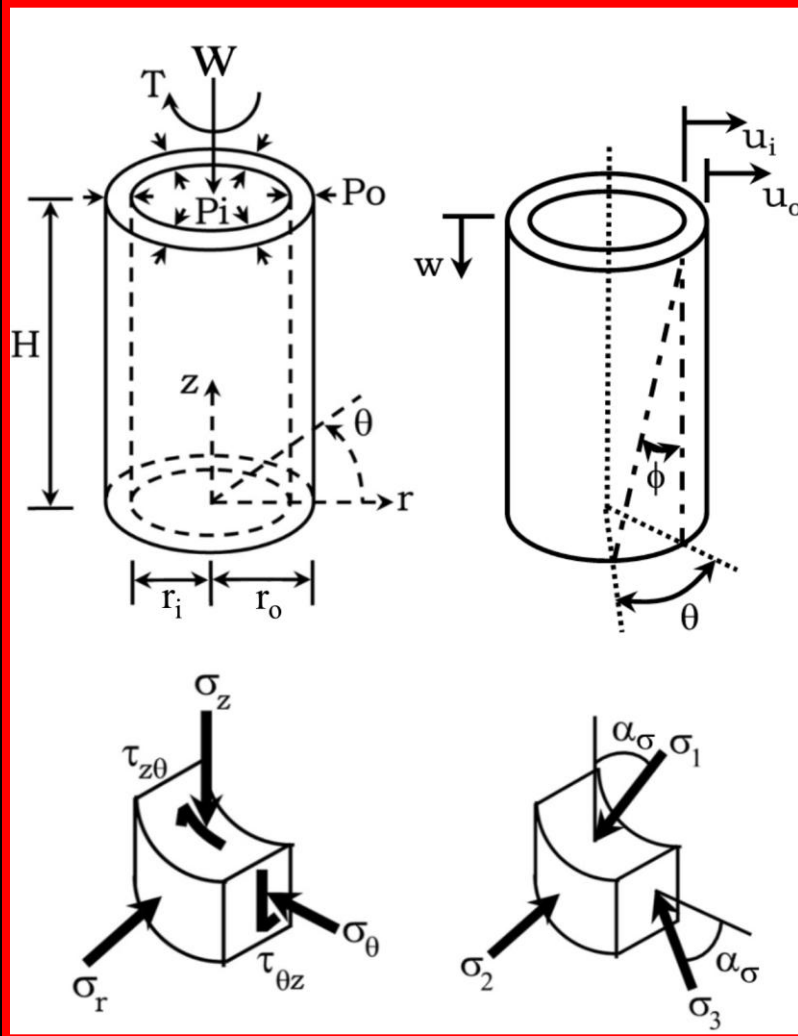
$$\frac{J_1 J_2}{J_3} = \text{Constant}$$

Lade

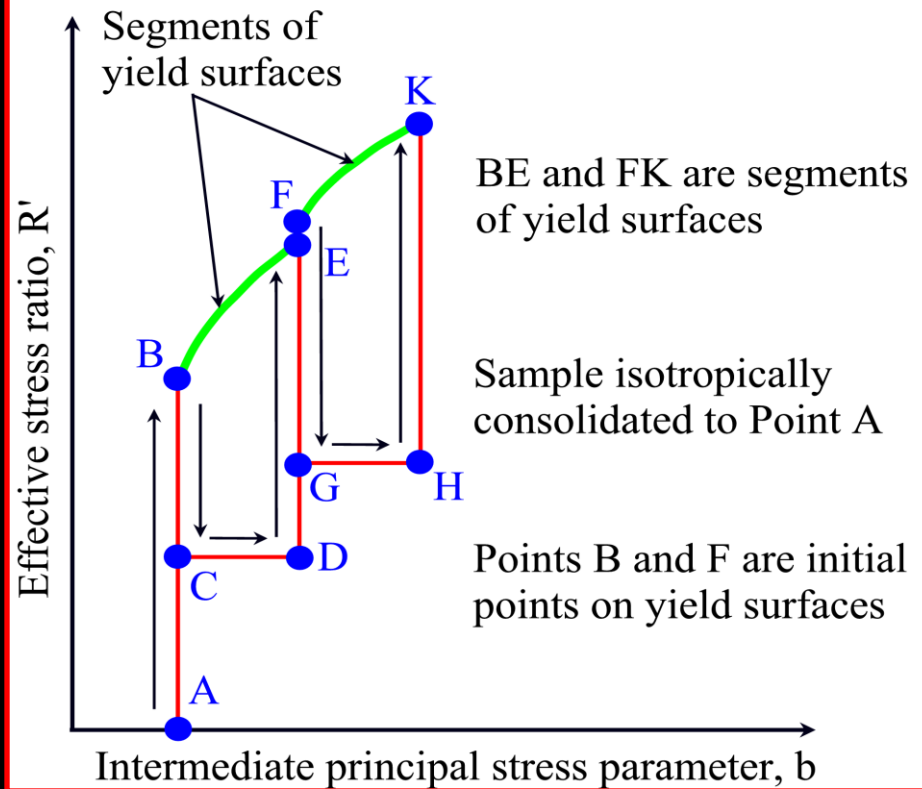
$$\frac{J_1^3}{J_3} = \text{Constant}$$

Yield criteria

Test Program: Leighton Buzzard sand



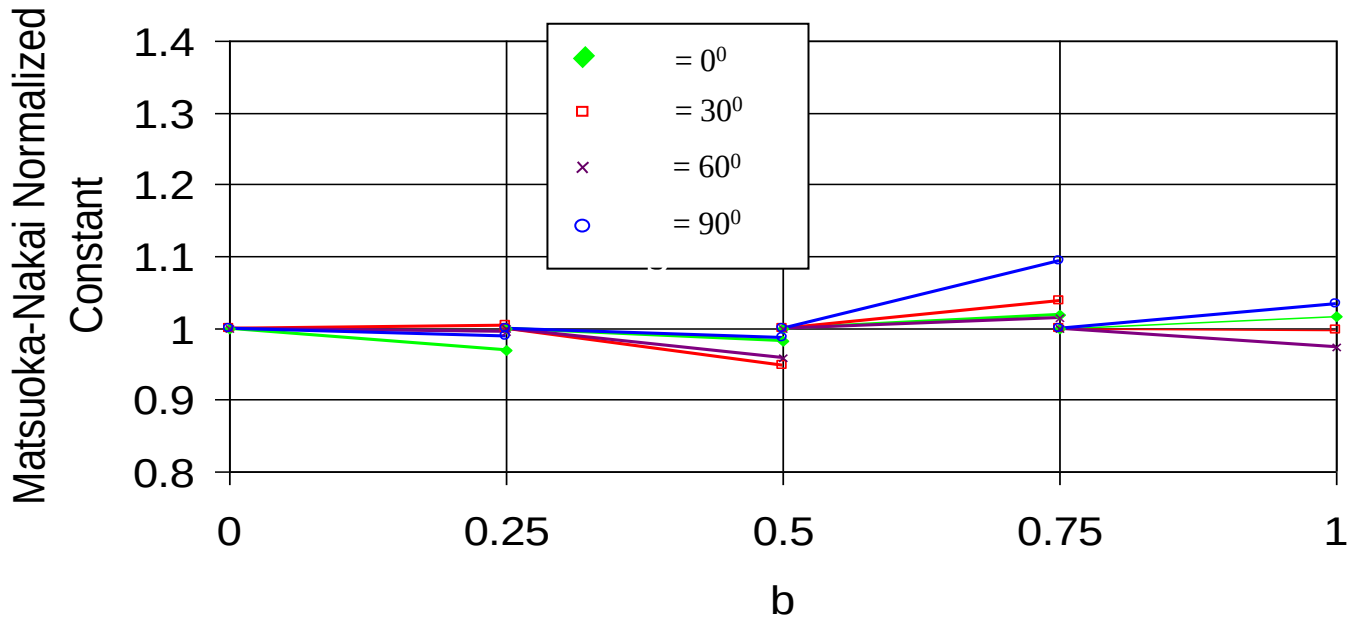
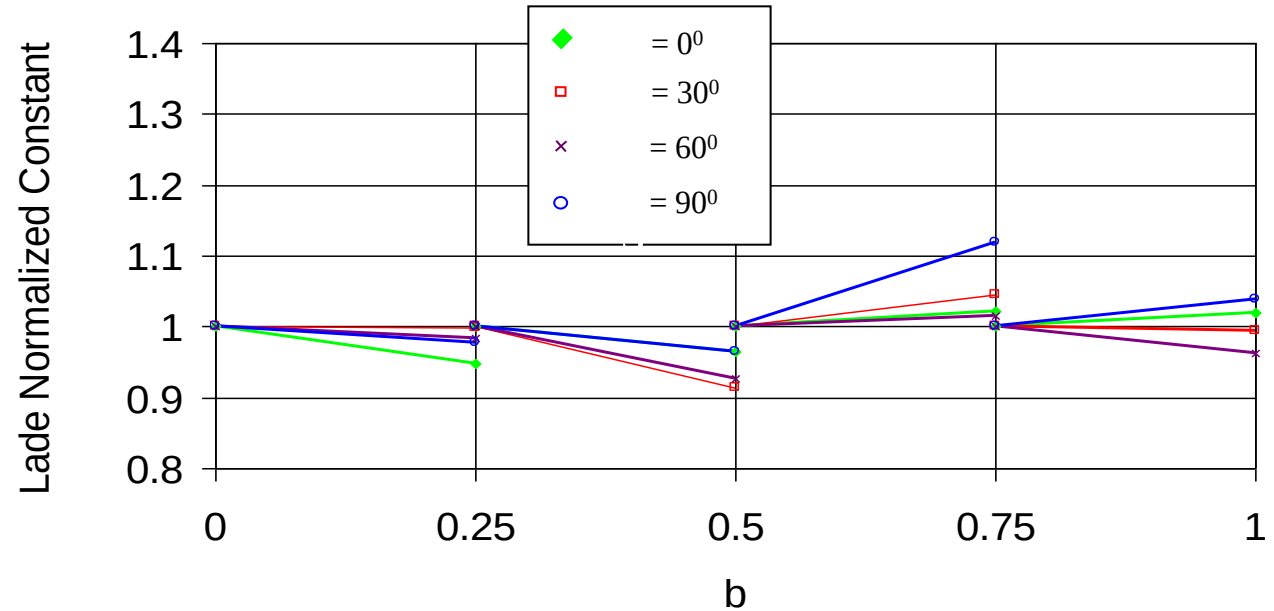
Stress state



Typical stress path

Yield behavior of sand under generalized stress conditions

Findings



Conclusions

- Stress paths identify segments of different yield surfaces in generalized stress space using hollow cylinder apparatus
- Matsuoka-Nakai and Lade yield criteria both adequately predict onset of yielding under generalized stress conditions
- Experimental yield surfaces indicate yield predictions predominately independent of rotation of major principal stress during initial consolidation stage