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;-----
; sl_3d.dat      influence of slope curvature on stability
;               of an open pit
;-----

; create model by joining radial cylinder and brick primitives
gen zone radcyl &
p0 0 0 25 p1 add 80 0 0 p2 add 0 0 -25 p3 add 0 80 0 &
dim 24.5 24.5 12 12 ratio 1 1 1 1.1
gen zone radcyl &
p0 0 0 0 p1 add 80 0 0 p2 add 0 0 -15 p3 add 0 80 0 &
dim 12 12 12 12 ratio 1 1 1 1.1 fill size 5 7 10 10
gen zone brick &
p0 0 -40 -15 p1 add 12 0 0 p2 add 0 40 0 p3 add 0 0 15 &
size 5 12 7
gen zone brick &
p0 12 -40 -15 p1 add 68 0 0 p2 add 0 40 0 p3 add 0 0 15 &
size 10 12 7 ratio 1.1 1 1
gen zone brick &
p0 12 -40 0 p1 add 68 0 0 p2 add 0 40 0 p3 add 12.5 0 25 &
p4 add 68 40 0 p5 add 12.5 40 25 p6 add 68 0 25 p7 add 68 40 25 &
size 10 12 10 rat 1.1 1 1
; install water table
ini pp 0 grad 0 0 -1e4 range z -15.1 0
call water.fis
; assign Mohr Coulomb model and properties
mod mo
pro bulk 2e8 she 1e8 fric 45 coh 1e6 ten 1e6
; boundary conditions
fix x range x -.1 .1
fix x range x 79.9 80.1
fix y range y -40.1 -39.9
fix y range y 79.9 80.1
fix x range z -15.1 -14.9
fix y range z -15.1 -14.9
fix z range z -15.1 -14.9
; initialize density: saturated and unsaturated
def ini_dens
  pnt = zone_head
  loop while pnt # null
    if z_pp(pnt) # 0.0 then
      z_density(pnt) = 2600
    else
      z_density(pnt) = 2500
    endif

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        pnt = z_next(pnt)
    endloop
end
ini_dens
set g 0 0 -10
; initialize gravity stresses
ini syy -6.25e5 grad 0 0 2.5e4
ini sxx -6.25e5 grad 0 0 2.5e4
ini szz -6.25e5 grad 0 0 2.5e4
; histories
hist unbal
hist gp xdisp 24.5 -40 25
hist gp zdisp 24.5 -40 25
hist gp xdisp 24.5 0 25
hist gp ydisp 24.5 0 25
hist gp zdisp 24.5 0 25
hist gp ydisp 0 24.5 25
hist gp zdisp 0 24.5 25
; equilibrate
solve
save sl_eq.sav
; reduce strength
pro coh 3.7e4
ini xd 0
ini yd 0
ini zd 0
ini xv 0
ini yv 0
ini zv 0
step 4000
save sl_fail.sav
;
; create plot views of results
;
; view : sl_geom (model grid)
plot create sl_geom
set out sl_geom.plt
plot set rot 20 0 50
plot set ang 20
plot set cent 40 20 5
plot add surface lcyan
plot add axes brown
plot hard
;

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; view : sl_water (water table with model grid)
plot create sl_water
set out sl_water.plt
plot set rot 20 0 50
plot set ang 20
plot set cent 40 20 5
plot add water lgra
plot add sketch black
plot hard
;
; view : sl_ppres (pore pressure contours)
plot create sl_ppres
set out sl_ppres.plt
plot set rot 20 0 50
plot set ang 20
plot set cent 40 20 5
plot add cont pp int 2.5e4 sh on
plot hard
;
; view : sl_disp (displacement contours)
plot create sl_disp
set out sl_disp.plt
plot set rot 20 0 50
plot set ang 20
plot set cent 40 20 5
plot add cont disp sh on
plot hard
;
; view : sl_hist (displacement histories)
plot create sl_hist
set out sl_hist.plt
plot add hist 2 3 7 8
plot hard
ret

```