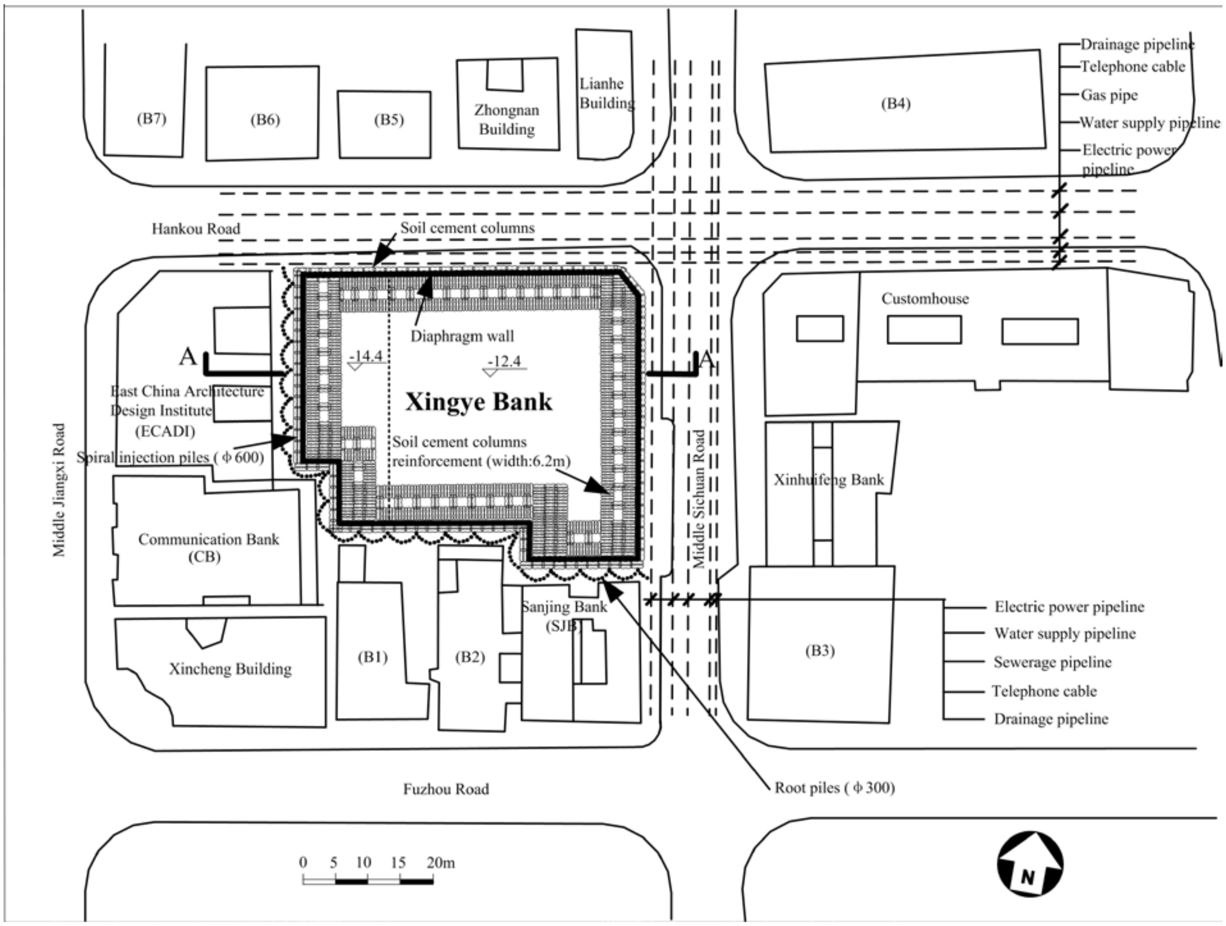


Fig. 1. Plan view of the deep excavation (Xu, 2007)

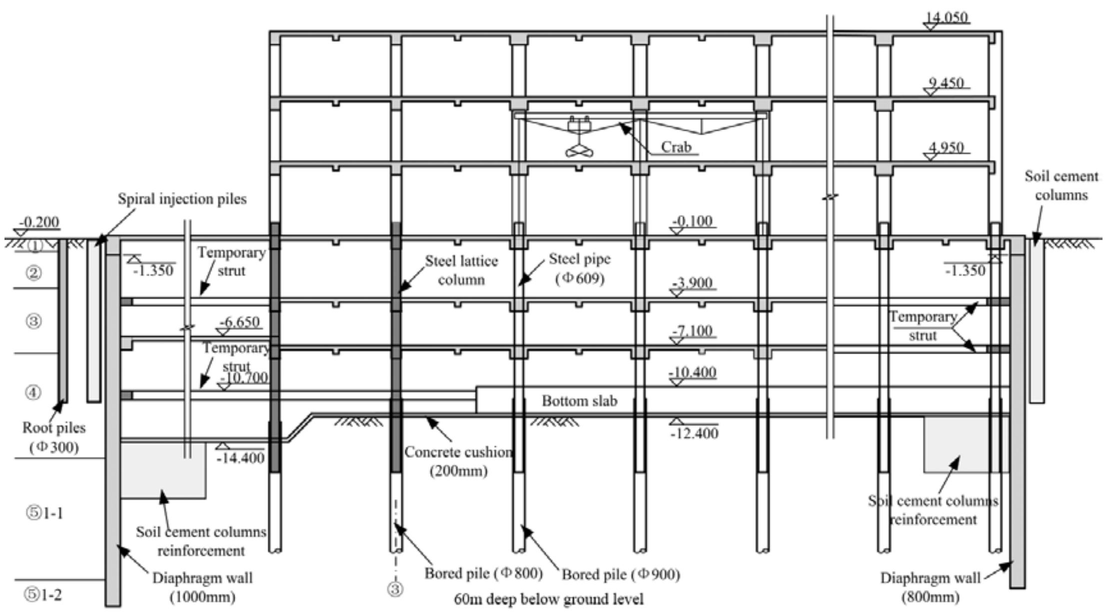


Fig. 2. Cross section A-A, see Fig. 1 (Xu, 2007)

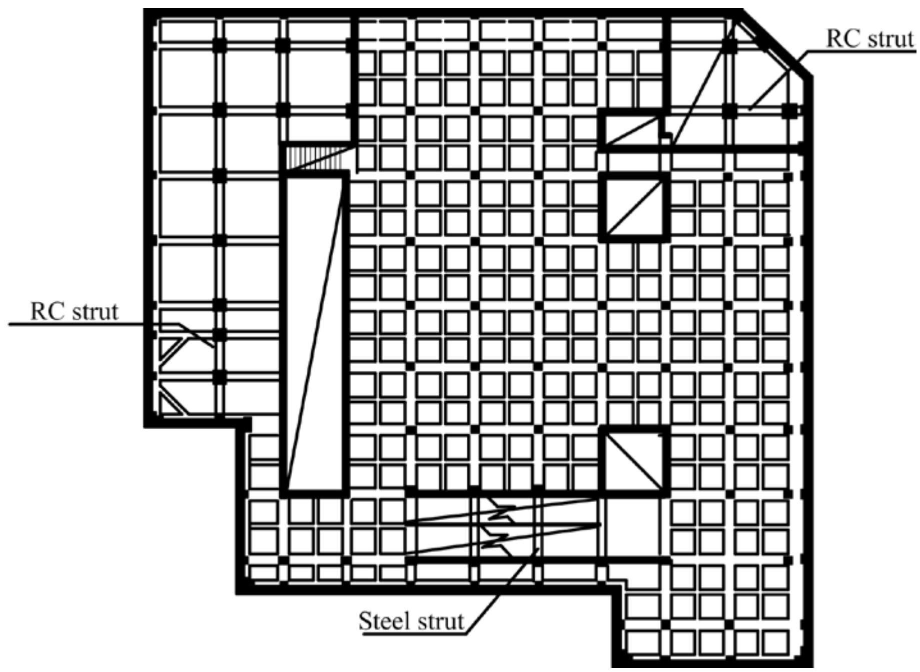
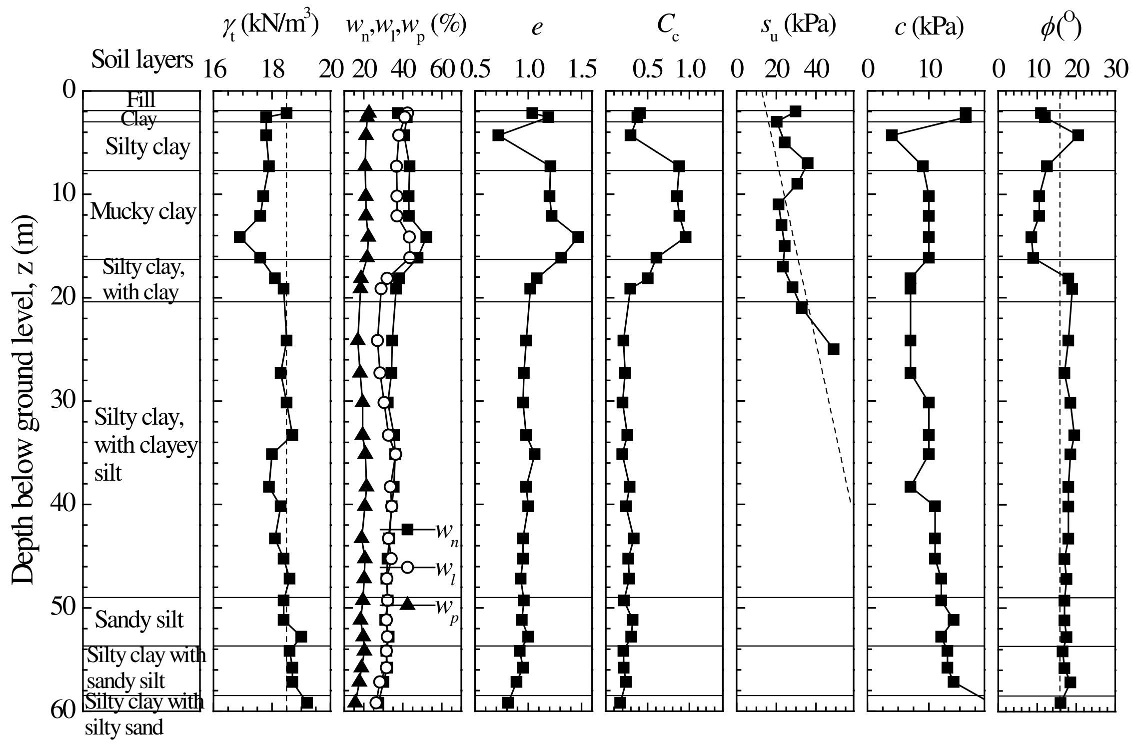


Fig. 3. Plan view of the ground floor slab and supporting beams (Xu, 2007)



Note: γ_t = unit weight, w_n = water content, w_p = plastic limit, w_l = liquid limit, e = void ratio, C_c = compressive index, s_u = field vane shear strength, c = cohesive strength, ϕ = internal friction angle

Fig. 4. Geotechnical profile and soil properties from the site investigation (Xu 2007)

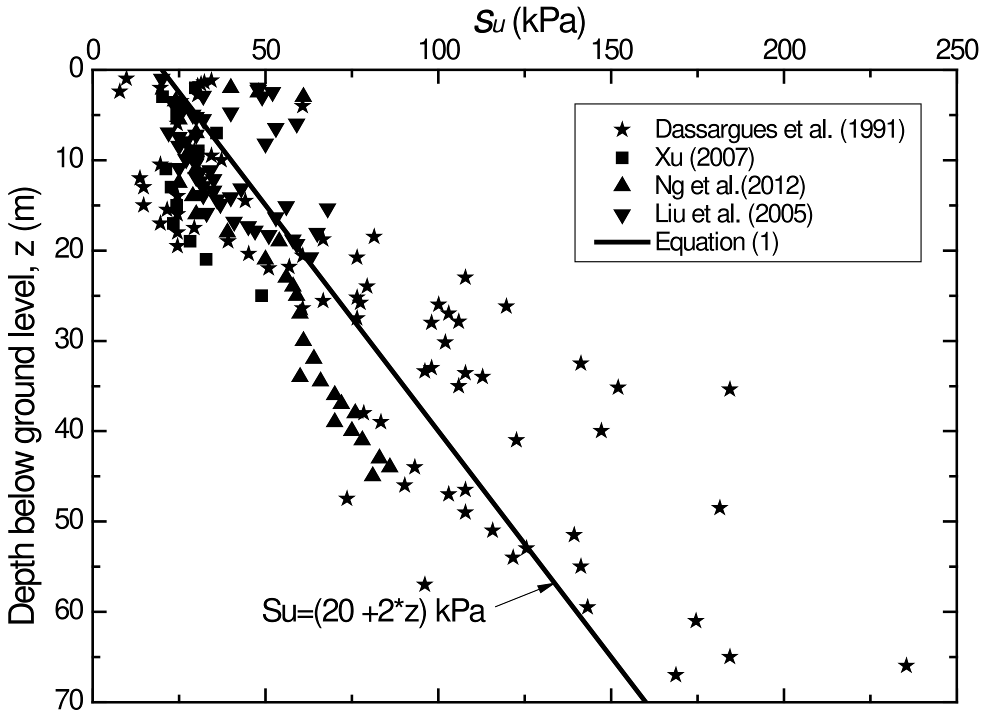


Fig. 5. Undrained shear strength profiles determined from four separate sites in Shanghai

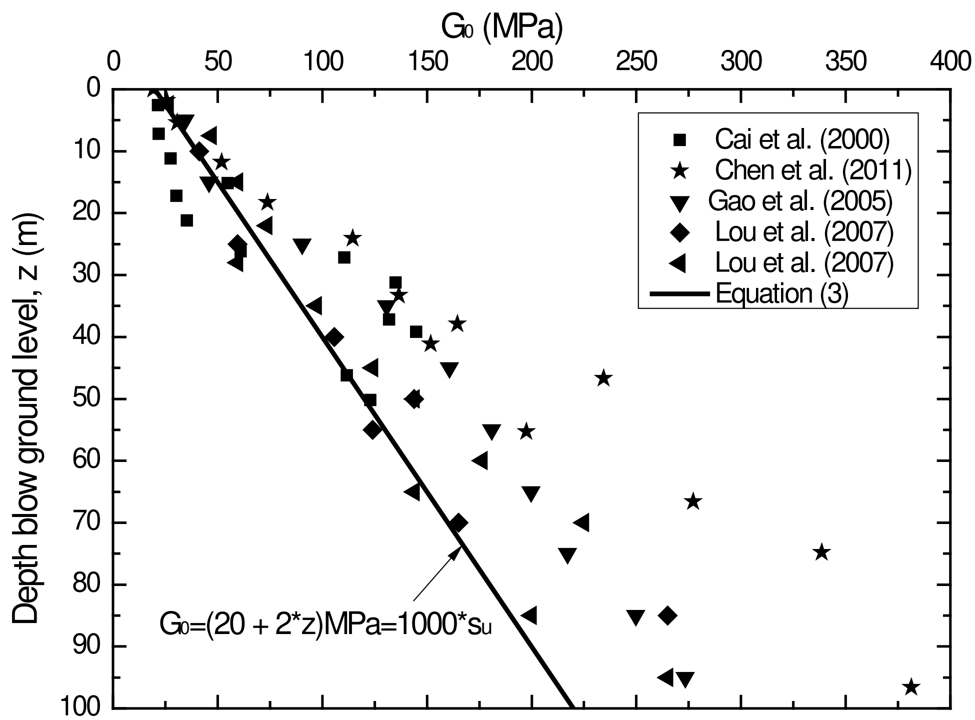


Fig. 6. Profile of G_0 determined from shear-wave velocity tests in Shanghai

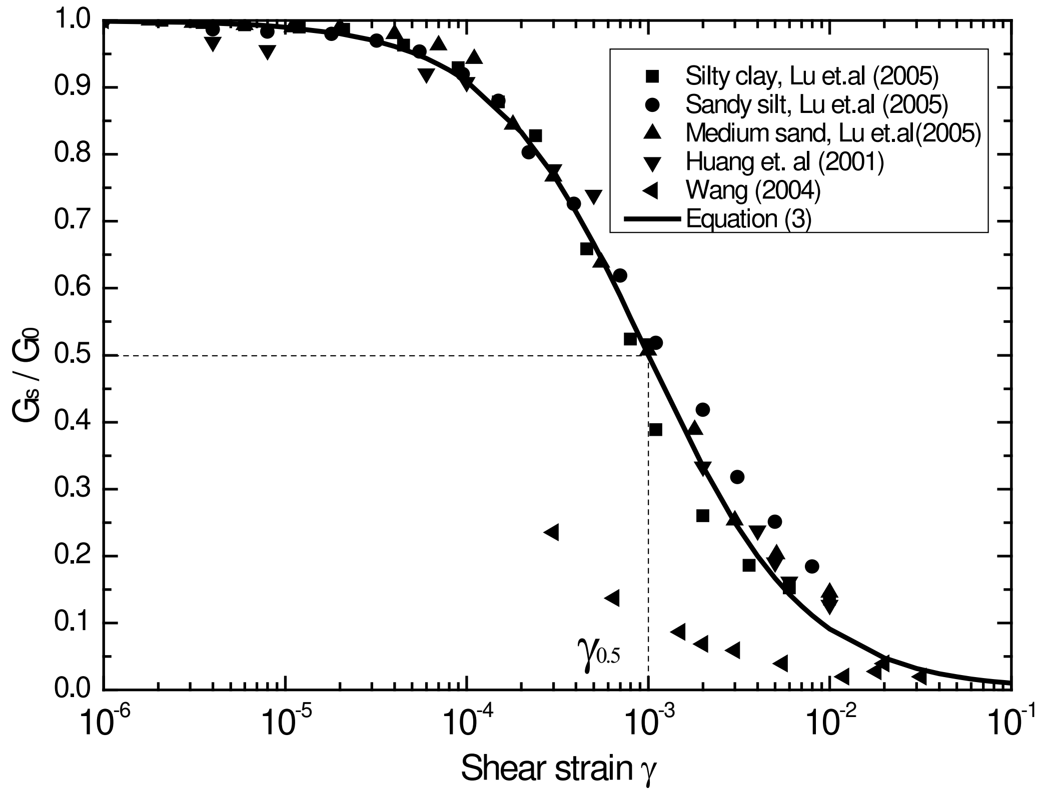


Fig. 7. Variation of normalised secant shear modulus G_s/G_0 with shear strain γ

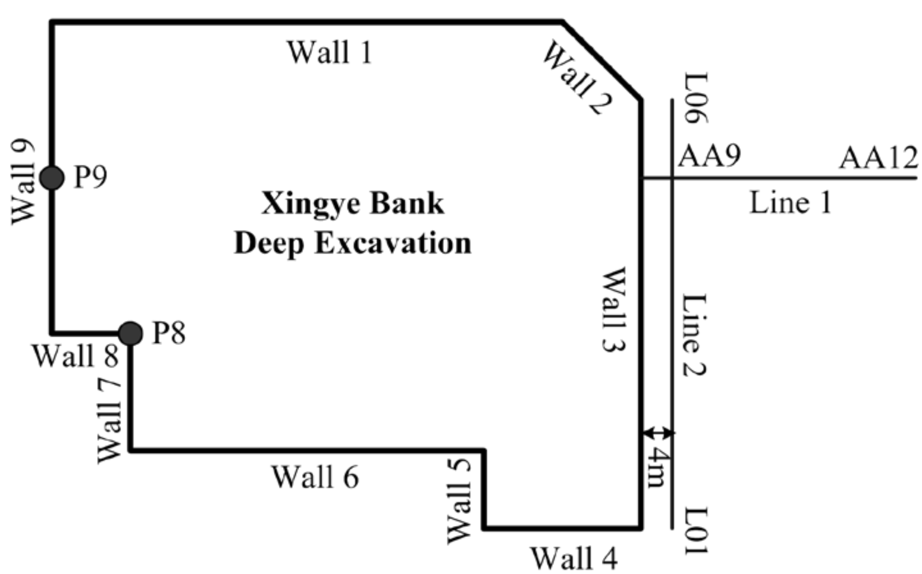


Fig. 8. Key field instrumentation locations

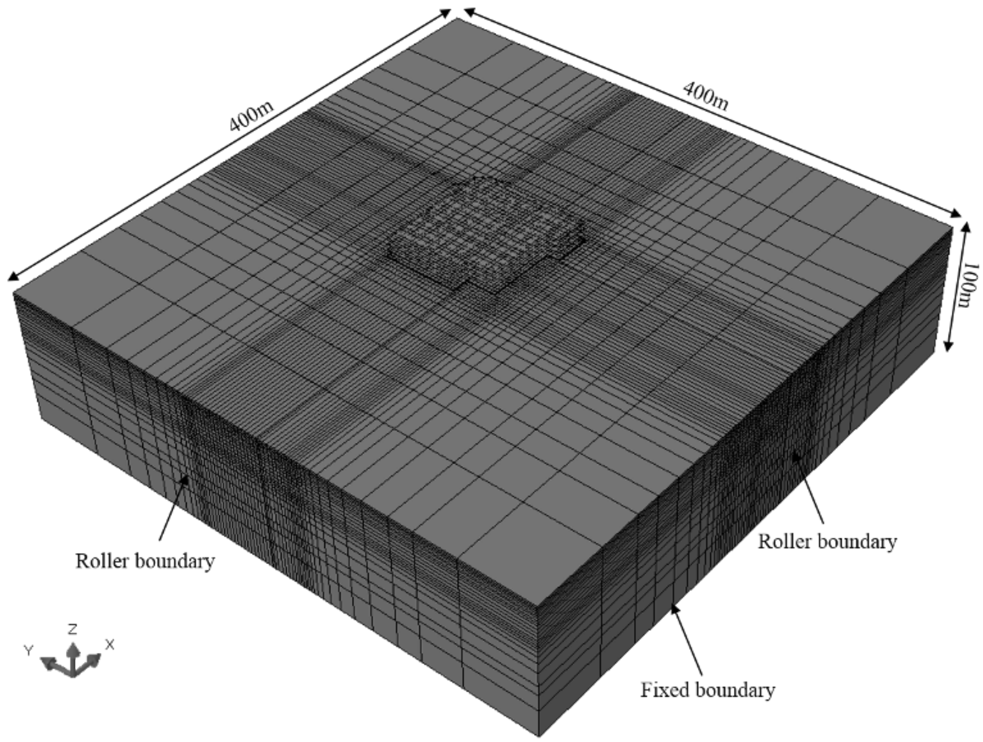


Fig. 9. Geometry and mesh of the whole model

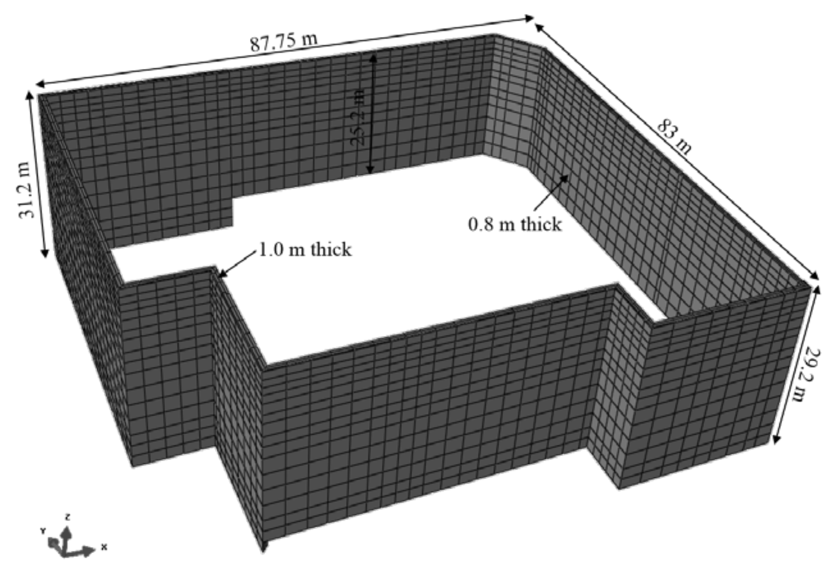


Fig. 10. Diaphragm wall geometry and mesh

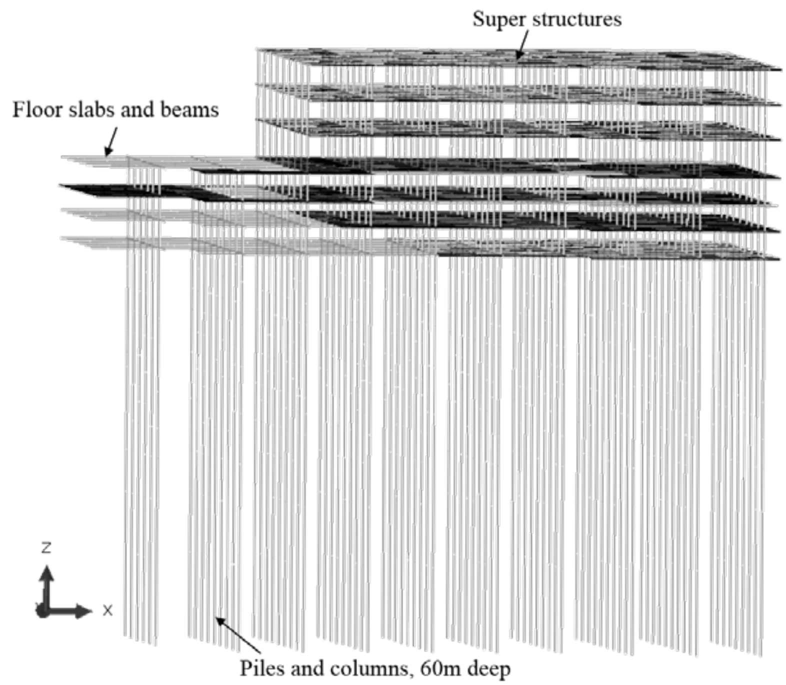


Fig. 11. Supporting system and superstructures

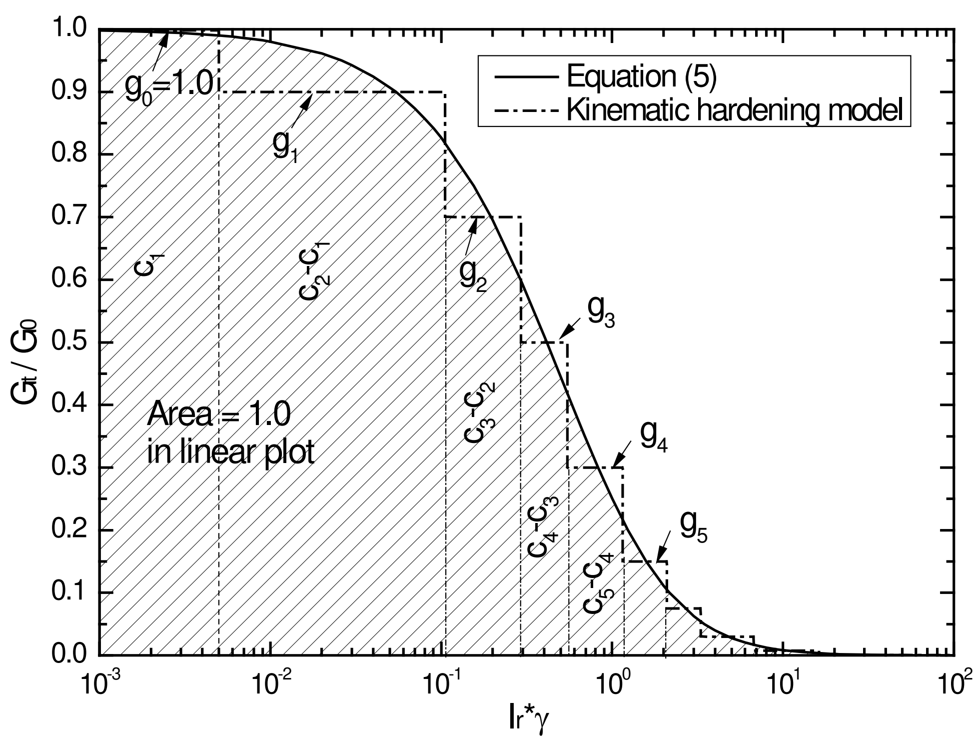


Fig. 12. Plot of G_t / G_0 vs I_r for Equation (5) and also for the kinematic hardening model based on the parameters in Table 2.

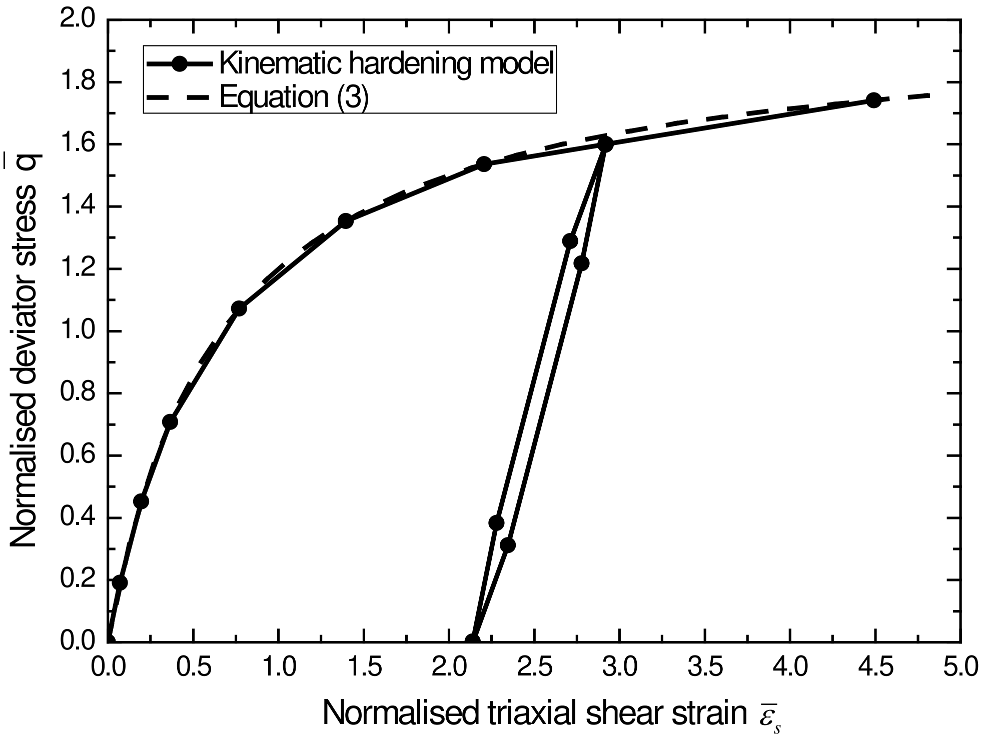


Fig. 13. Plot of normalized deviator stress $\bar{q}$ vs. normalized triaxial shear strain $\bar{\varepsilon}_s$. Comparison between the results of a triaxial compression tests determined on the basis of Equation (3) and the performance of the kinematic hardening model (including an unload-reload cycle) based on the parameters used in Table 2) The filled circles indicate intersections with one of the yield surfaces.

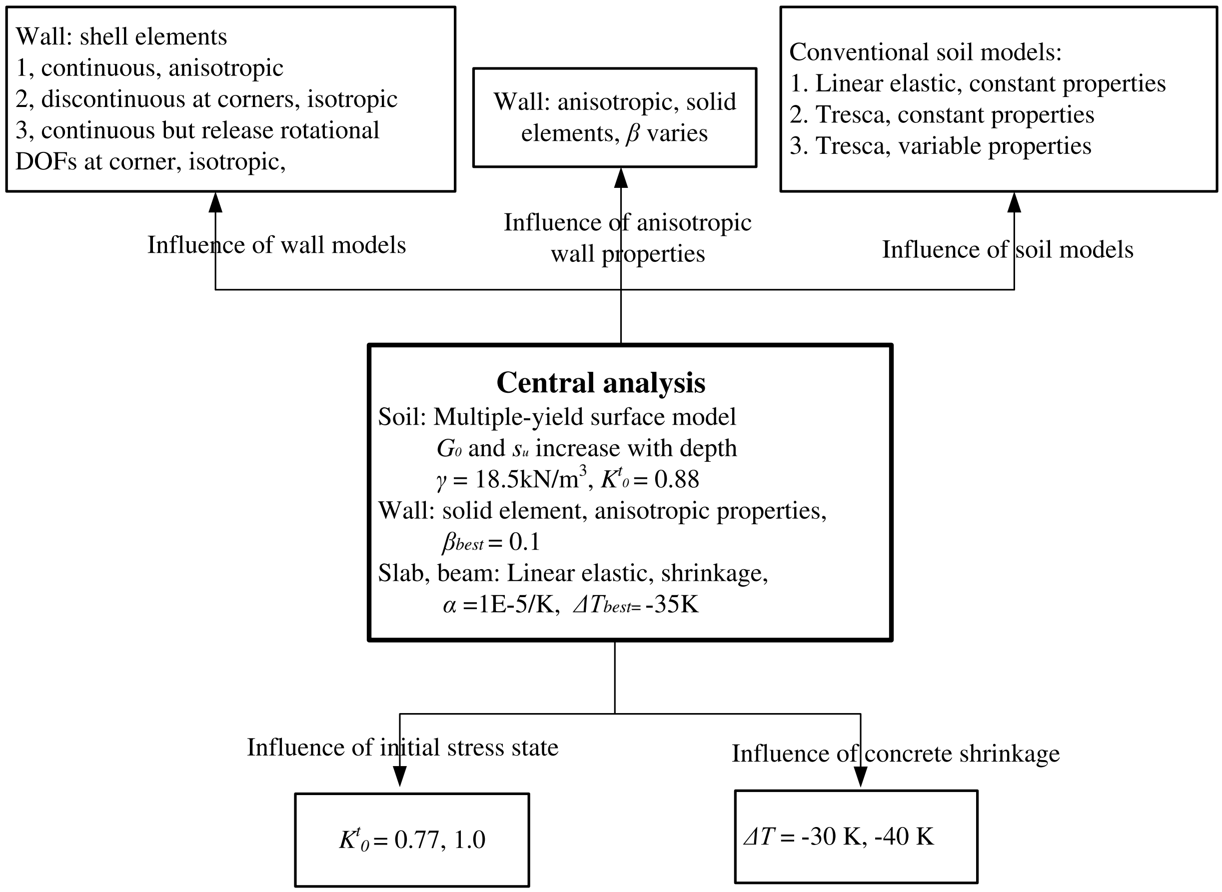
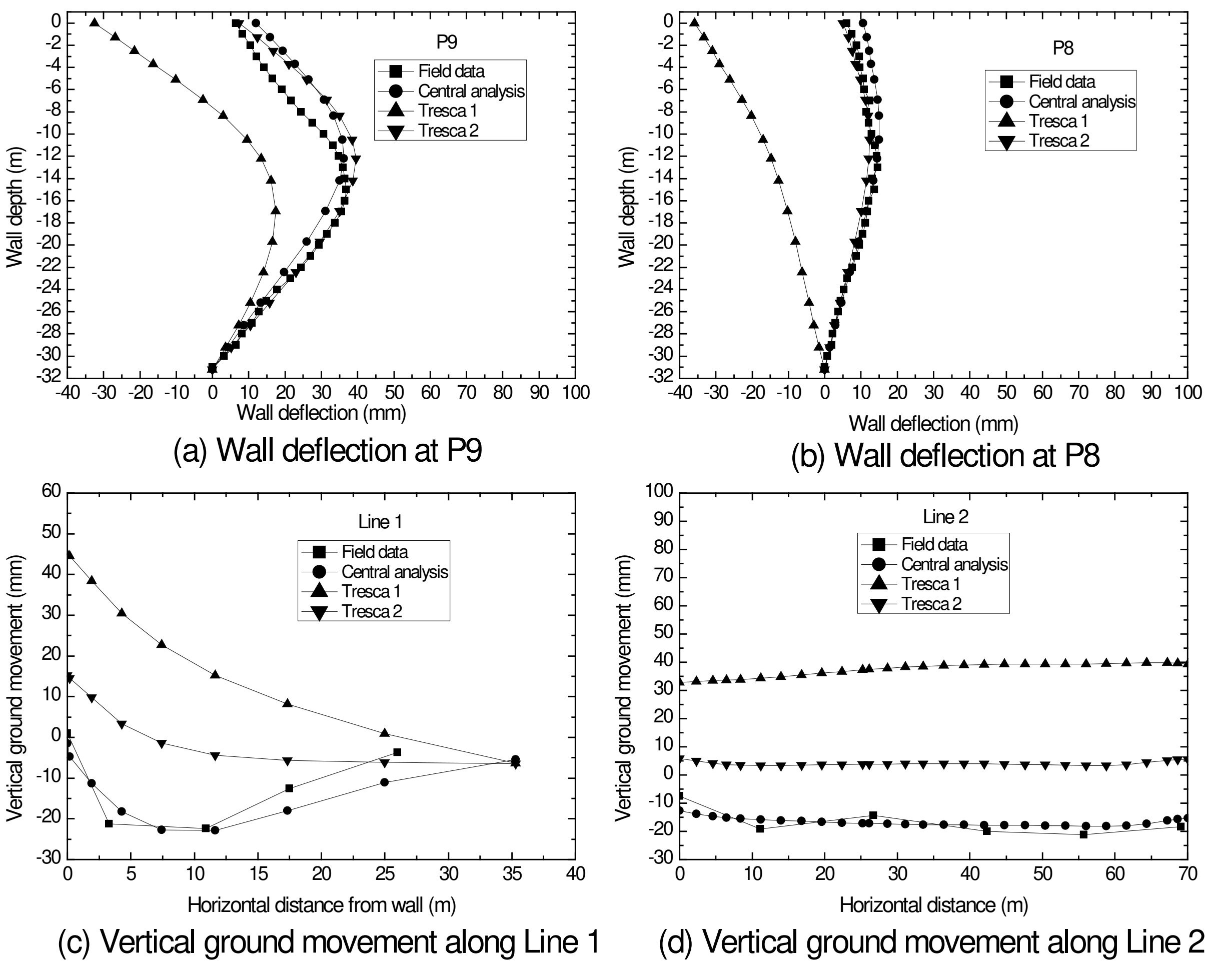


Fig. 14. Analysis strategy



(a) Wall deflection at P9

(b) Wall deflection at P8

(c) Vertical ground movement along Line 1

(d) Vertical ground movement along Line 2

Fig. 15. Wall deflection and ground settlements (effects of soil models)

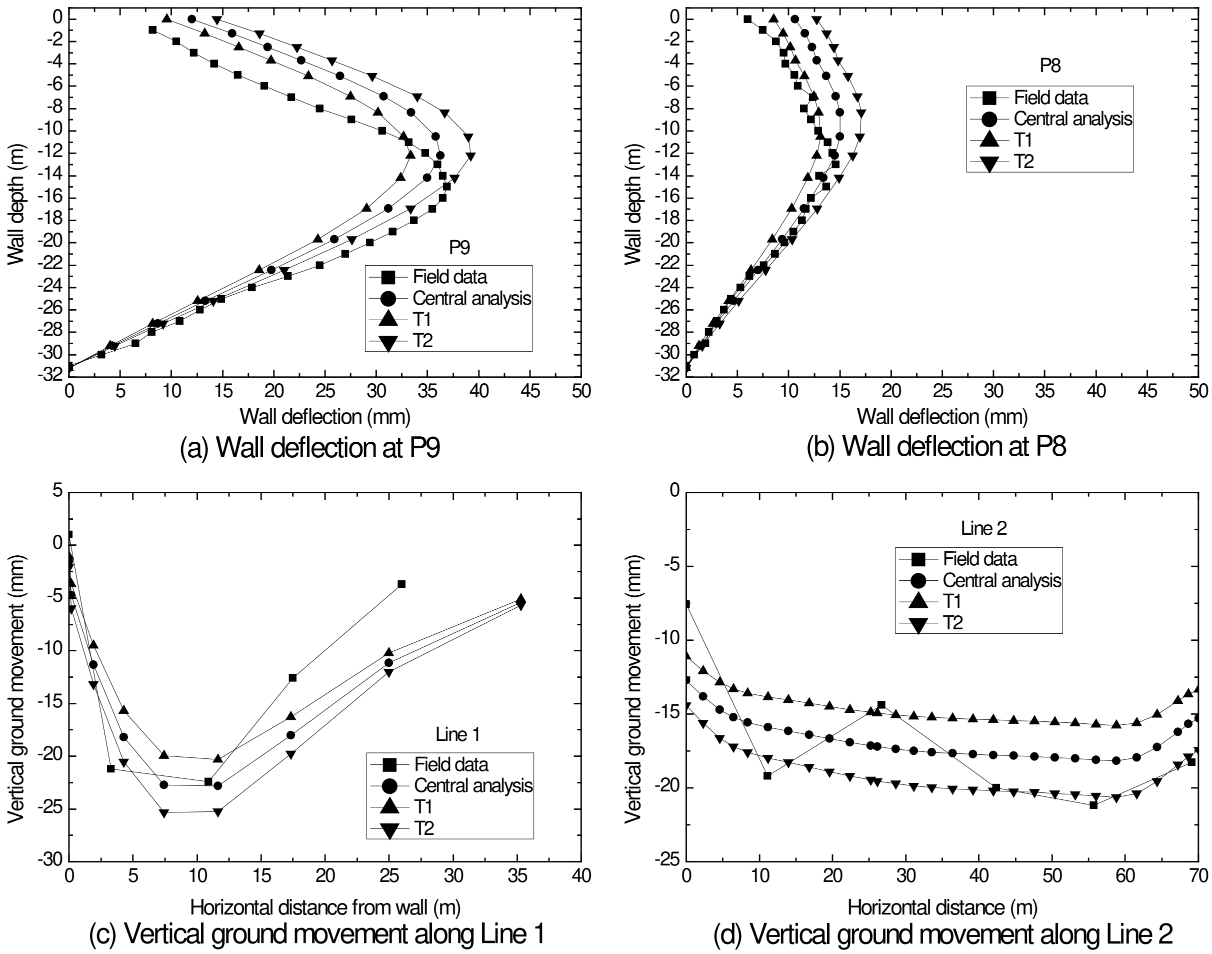
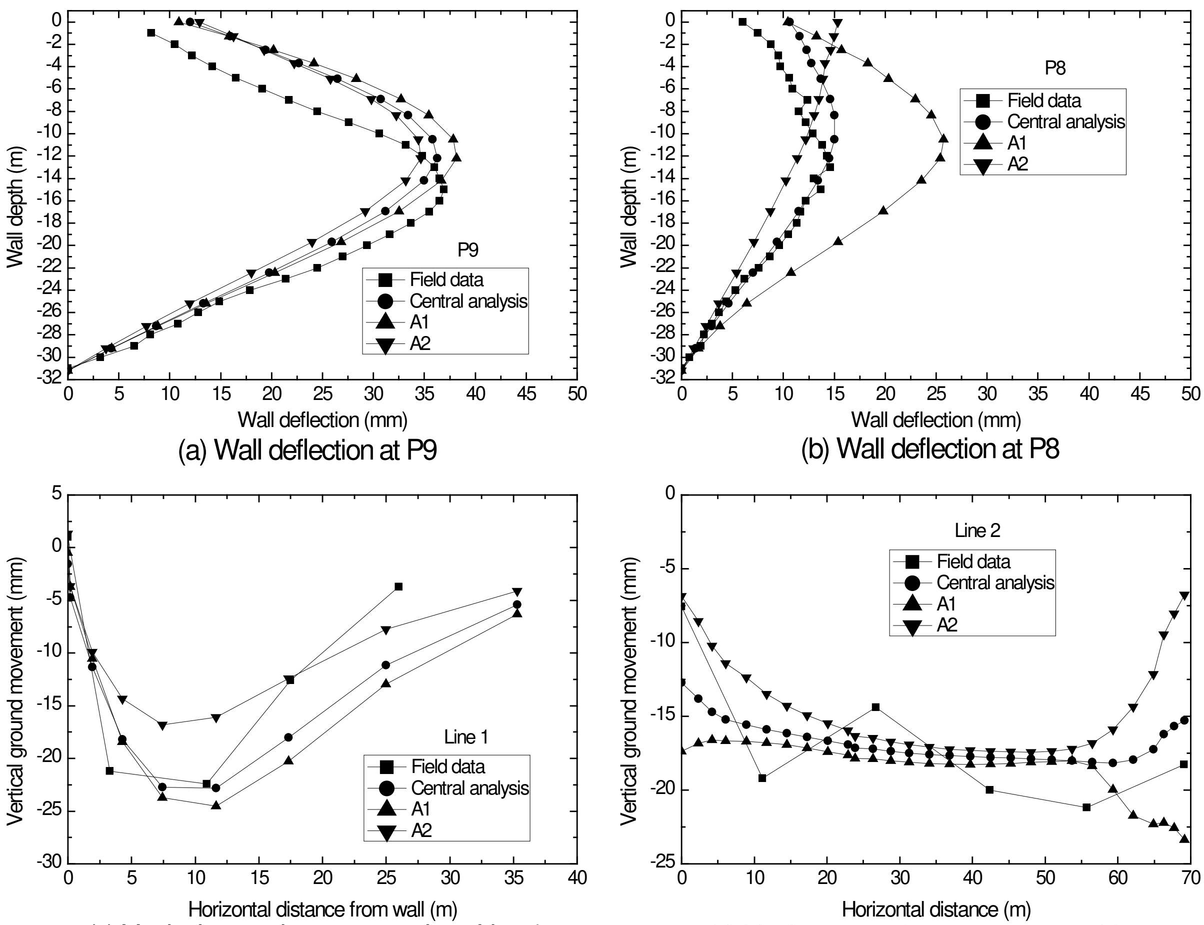


Fig. 16. Wall deflections and Ground movements (thermal effects)



(a) Wall deflection at P9

(b) Wall deflection at P8

(c) Vertical ground movement along Line 1

(d) Vertical ground movement along Line 2

Fig. 17. Wall deflections and ground movements (effects of joints)

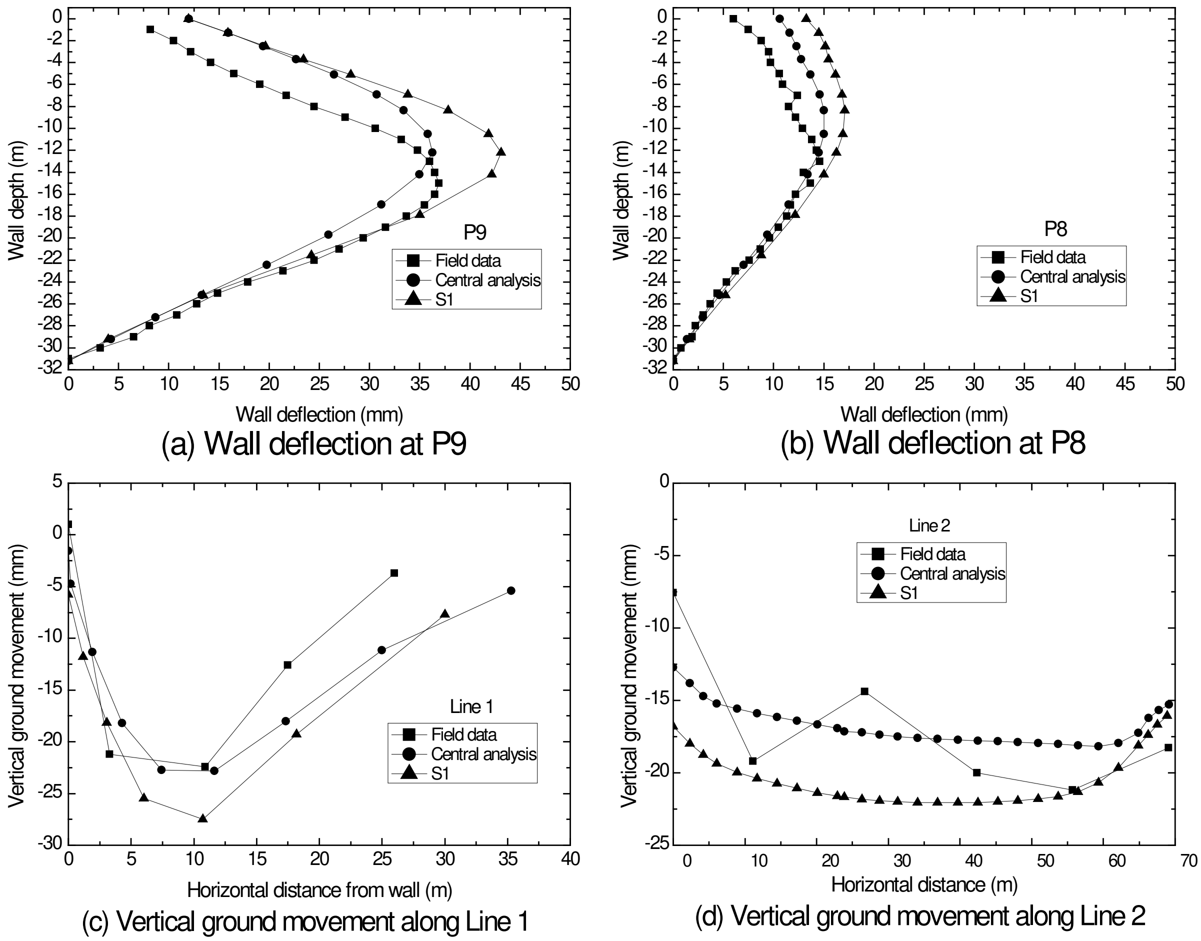


Fig. 18. Wall deflections and ground movements (effects of shell elements)

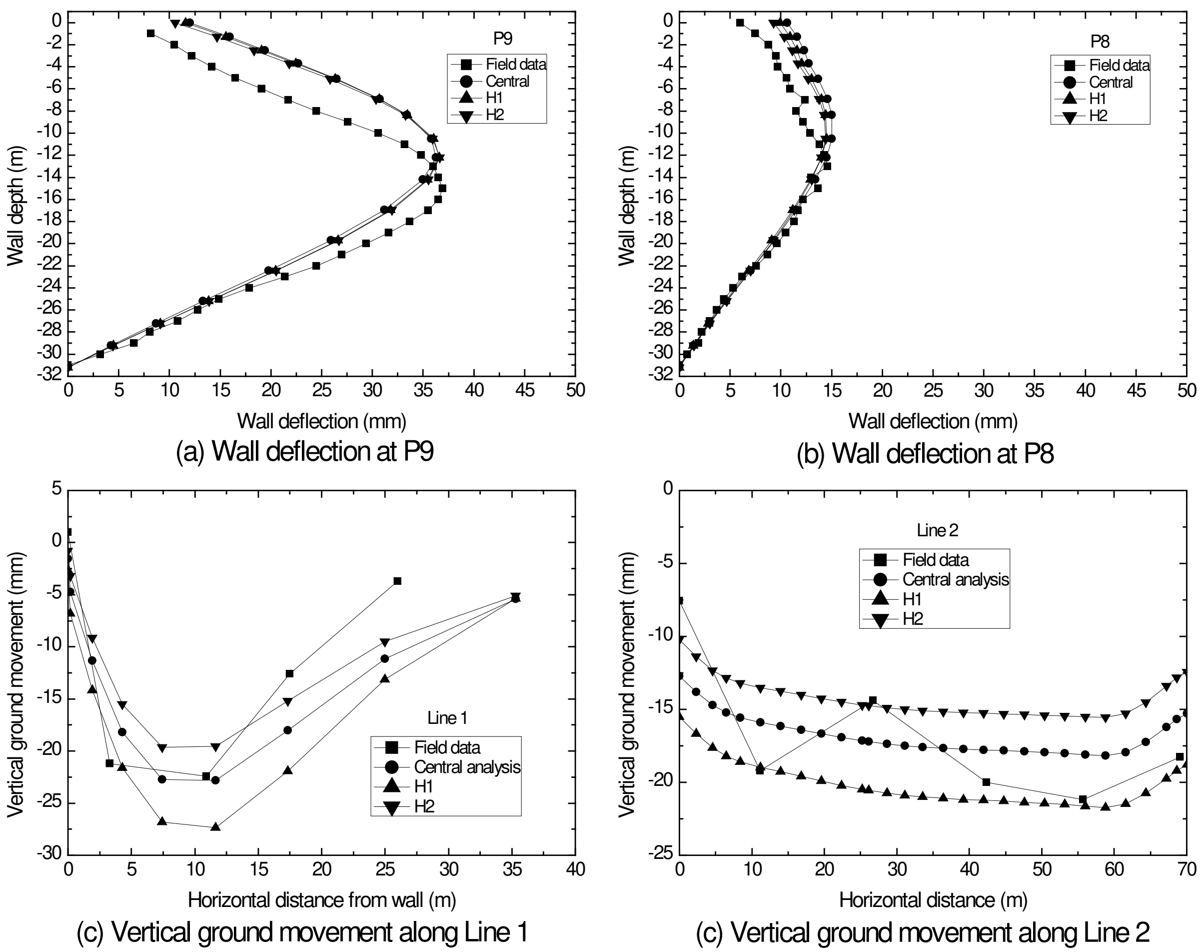


Fig. 19. Wall deflections and ground movements (K_0^t effects)