

Settlements associated with plastic clays are likely to be significantly greater than those associated with most other types of soils. What is more, settlement may take place over a considerable period of time. Both the amount and the distribution are related to the distance from the excavation. For instance, Peck³² mentioned settlements in soft clays of up to 0.2% of the depth of the excavation being recorded at distances of three or four times the depth. He concluded that settlement around an excavation can be reduced only if floor heave and inward movement of sheeting can be reduced substantially. A summary of settlements due to excavations of basements in Chicago in relation to distance from the excavation is given in Figure 39.7.

Peck's findings have been supported by workers in Britain. For example, Cole and Burland³⁵ made measurements, using precise surveying methods, of the inward movement of a diaphragm retaining wall about an excavation some 20 m in depth in clay. They found that these movements were notably time dependent and necessitated the use of support at an early stage to minimize movements outside the excavation. It was suggested that the time-dependent nature of the movements was due to the clay behind the retaining wall becoming softened. The horizontal movements of the ground surface outside the excavation were two to three times larger than the corresponding vertical movements. Cole and Burland went on to point out that structures may be more sensitive to horizontal than to vertical movements and that horizontal ground movements attributable to a wide excavation may be sufficiently large to cause damage or loss of serviceability to neighbouring structures.

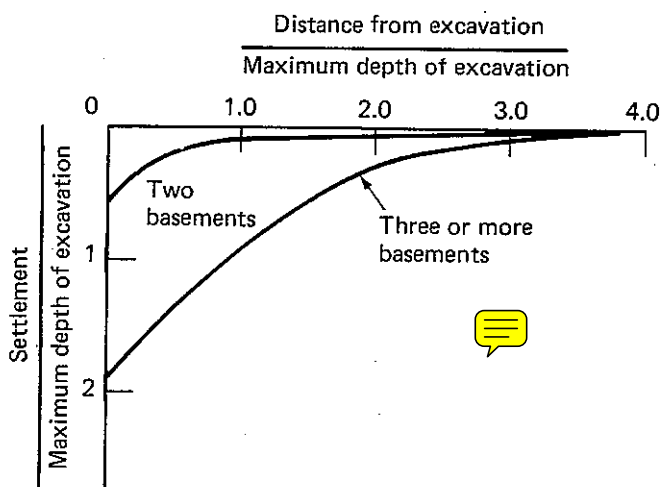


Figure 39.7 Summary of settlements due to excavation of basements in downtown Chicago (after Peck³²)

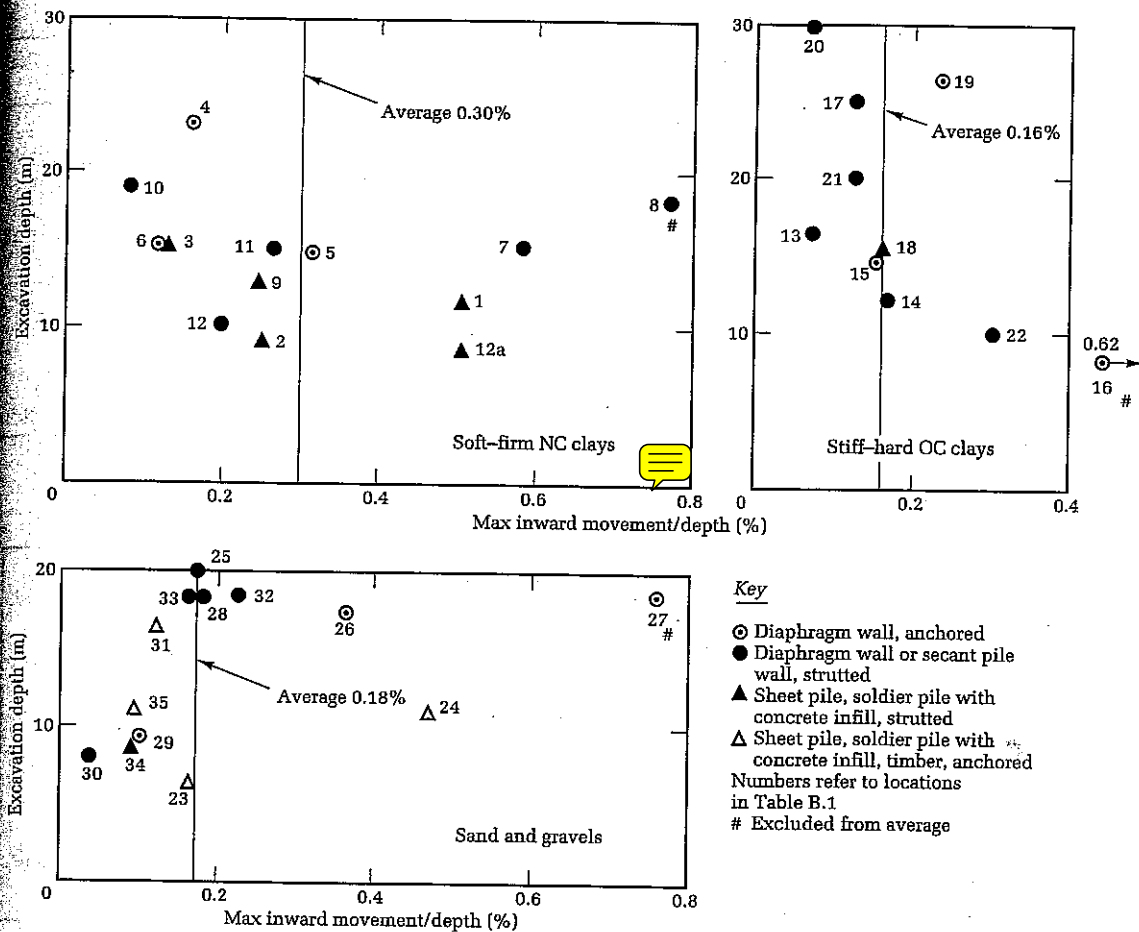


Fig. 9.41 Observed maximum inward movement of excavation supports expressed as a percentage of the excavation depth.

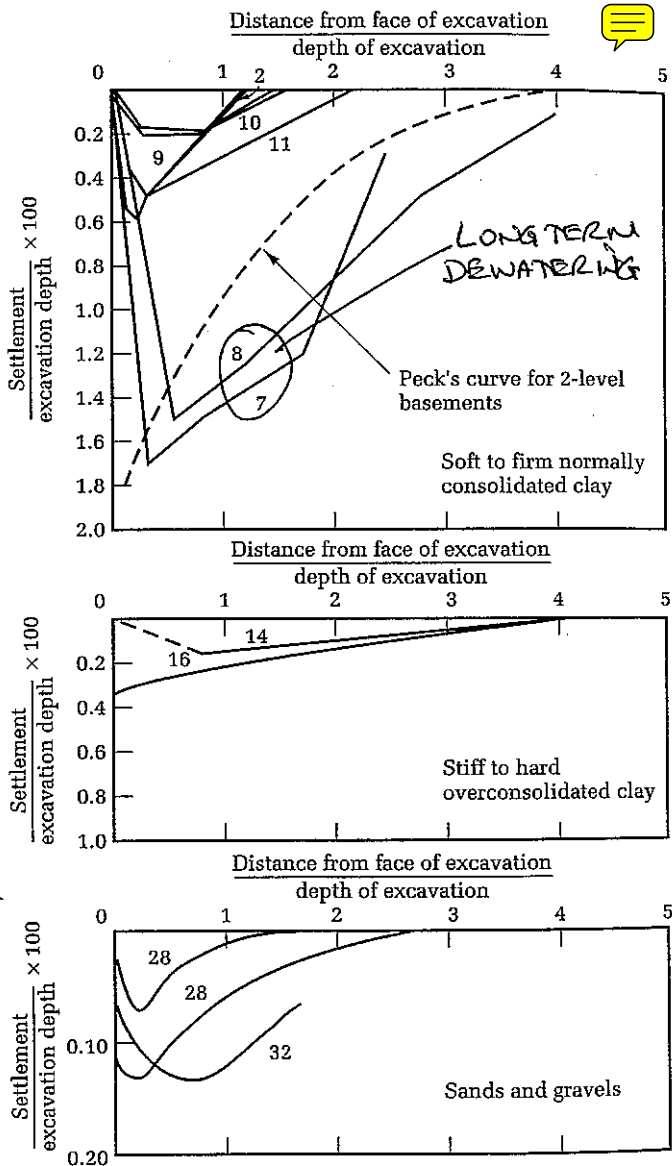


Fig. 9.43 Profile of ground surface settlement in relation to distance from excavated face.