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CHECK LIST FOR DESIGN OF PILE FOUNDATIONS

by

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The design of a pile foundation cannot be carried out by cook-book procedures. Nevertheless, the design can proceed in a rational matter such that no important points are overlooked. The following checklist is undoubtedly oversimplified, but it may prove useful.

Check List

1. Perform subsurface investigation and draw soil profile(s) across site, showing appropriate numerical values of soil properties. Indicate if and where man-made obstructions may occur.
 2. Identify and classify zones in the subsoil according to whether they are favorable or unfavorable with respect to foundation performance.
 - a. Favorable: strong, relatively incompressible
 - b. Unfavorable: weak, compressible
 3. Determine nature of the loads to be supported and the probability of their occurrence.
 4. Assume, successively, that the piles will be supported by or in each of the favorable zones and calculate (or estimate) the detrimental effects of all overlying (negative skin friction) and underlying (settlement) unfavorable zones. Eliminate all unsatisfactory alternatives.
 5. For each satisfactory alternative, determine appropriate shapes(s) of pile (taper, bulb, cylindrical, etc.).
 6. For each appropriate shape, choose diameter and reasonable load per pile, and estimate pile length.
 7. Consider problems of installation (heave, jetting, distortion, discontinuities, etc.) and eliminate unsuitable types.
 8. Make general economic comparison of remaining suitable alternatives and design accordingly.
 9. Check for group action with respect to design (capacity, settlement) and construction (compaction, heave).
 10. Determine if pile load tests are needed. If so, specify procedure, including that for driving test piles. Make sure all supporting information is to be obtained (hammer, cushion block, complete driving record, etc.).
 11. Establish requirements for hammer and cushion blocks; determine whether piles are to be driven to specified resistance; establish how resistance is to be determined (based on load tests, formula formula fitted to load test, experience in locality?).
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12. Establish any necessary restrictions on installation procedures and results (verticality, straightness, water in piles, vibrations, etc.).
13. Review reasonableness of design and specifications. Are the specifications clear as to what the contractor must do? Are they clear as to what he will be paid for? Do they provide for prompt adjustment to meet unexpected conditions?

Conclusion. Imperfect as the foregoing check list may be, it embodies the essential steps toward good design. An engineer who keeps up with developments in theory and practice can fit new findings into the framework. His designs should then be as sound as present knowledge permits. If he has done his job well, problems should be restricted to those brought about by the inevitable shortcomings in the state of the art, and these should be susceptible to solution on the job by reasonable men.