

# Analysis and Design of Substructures: Limit State Design (Balkema Proceedings and Monographs in Engineering, Water and)

By Swami Saran



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A systematic treatment of the analysis and design of substructures, dealing with all aspects including soil exploration, laboratory testing, analysis and structural design. The major types of foundations and retaining structures including footings and rafts, piles and wells are described. The first six chapters deal with the engineering properties of soil, principles of soil exploration and limit state design, general design principles of foundations and earth pressures. The next six chapters cover the analysis and design of shallow foundations, pile foundations, bridge substructures, marine substructures, rigid and flexible retaining walls. A chapter is devoted to foundations in expansive soils, and another to the design of foundations of transmission towers, while the final chapter focuses on reinforced earth as a construction material for retaining structures and ground improvement. A large number of illustrative examples and designs have been included in the text. It will be useful to undergraduate and postgraduate students of civil engineering, and to practising engineers.



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#### **Editorial Review**

About the Author

Dr. Swami Saran, emeritus fellow at the Indian Institute of Technology, Roorkee, obtained his Pd.D. in 1969 from the University of Roorkee. An established teacher, researcher and an active consultant, he is the recipient of the Khosla Research Medal, IGS, ISET, ISTE, ISCMS awards. He has guided 22 Ph.D. theses, 68 Master's theses and has published 169 research papers and five books including (i) Design of Substructures, (ii) Soil Dynamics and Machine Foundations and (iii) Reinforced Soil and its Engineering Applications. Dr. Saran has initiated research work on reinforced earth, analysis of shallow foundations using constitutive laws, displacement-dependent analysis of retaining walls both in static and dynamic conditions, and dynamic response of embedded block foundation. He has provided consultancy to more than 300 projects among which are multi-storeyed buildings, cement and tyre factories, machines foundations, chimneys and towers, bridges, oil storage tanks, historical monuments, ropeway, etc. He is a member of several national and international professional societies and visited the UK, Australia, the USA, Bangkok and Nepal. Dr. Saran delivered the IGS annual lecture at IGC-2004 (Warrangal).

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