



FULL LENGTH ARTICLE

Application of ultimate limit state design for axially loaded single piles in Egyptian geotechnical practice



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Received 5 July 2014; revised 13 January 2015; accepted 8 February 2015

KEYWORDS

Limit state design;
Egyptian Code of Practice;
Geotechnical design;
Load and resistance factor
design;
Pile foundation;
Calibration

Abstract For a long time, the framework of geotechnical design in Egypt has been based mainly on Working Stress Design (WSD) philosophy with the global safety concept as presented in the current version of the Egyptian Code of Practice for Soil Mechanics and Foundations Design and Construction [1]. This design philosophy is supported by long-term experience, considering local experiences and is adopted to fulfill the required safety margin. Limit State Design (LSD) philosophy, on the other side, has already been applied for the design of reinforced concrete structures as introduced in the Egyptian Code of Practice for the Design and Construction of Reinforced Concrete Structures [2]. Applying LSD for superstructure and WSD for foundations often results in design misleading because of the incompatibility between the two design philosophies. Accordingly, implementation of LSD philosophy for geotechnical designs in Egypt has become mandatory and the transition to this new design philosophy of LSD should be as smooth and gradual as possible to allow for a better acceptance by the Egyptian geotechnical community. LSD philosophy using partial safety factors has been applied worldwide using two different approaches: factored strength approach and factored resistance approach. During this study, resistance reduction factors are calibrated on the basis of calibration-by-fitting technique, to be used with factored resistance approach for axially loaded single piles. The calibrated resistance reduction factors from this study are found to be relatively consistent with those values adopted in other geotechnical design codes worldwide.

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Peer review under responsibility of Housing and Building National Research Center.



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Introduction

Design methods in both geotechnical and structural engineering may be generally associated with some degrees of uncertainties due to potential material variability and/or uncertainties of the adopted design model itself. These various uncertainties are usually accounted for through the implementation of safety factors. Working Stress Design (WSD) and Limit State Design (LSD) are the main two philosophies that

Egyptian Code And Practice For Soil Mechanics

G.E. Blight,A.B. Fourie,G.R. Wardle

Egyptian Code And Practice For Soil Mechanics:

Engineering Characteristics of Arid Soils P.G. Fookes, R.H.G. Parry, 2020-08-26 Soils formed or now existing under arid climatic conditions cover more than one third of the world's land surface. Many have unique characteristics which can pose difficult geotechnical problems. This text considers these problems and suggests ways of overcoming them. *Sustainable Issues in Transportation Engineering* Louay Mohammad, Ragaa Abd El-Hakim, 2019-11-01 This book of the GeoMEast 2019 proceedings includes a collection of research and practical papers from an international research and technology activities on recent developments in pavement design modeling and performance and effects on infrastructure green energy technology and integration. Sustainability is increasingly a key priority in engineering practices. With the aging transportation infrastructure and renewed emphasis on infrastructure renovation by transportation agencies, innovations are urgently needed to develop materials, designs and practices to ensure the sustainability of transportation infrastructure.

Geotechnics for Developing Africa G.E. Blight, A.B. Fourie, G.R. Wardle, 1999-01-01 The proceedings represent a valuable reference on geotechnical problems peculiar to Africa and for engineering solutions to local problems. Topics covered are Foundation engineering and lateral support, Methods of design and analysis, Monitoring laboratory and field testing, Municipal industrial and mining waste and environmental geotechnics, Soil improvement, Transportation geotechnics, Case studies. The proceedings are also an invaluable source of data on the properties of African soils, the properties of residual and tropical soils as well as climate related problems. *Geotechnical Safety and Risk IV* Limin Zhang, Yu Wang, Gang Wang, Li Dianqing, 2013-11-15 *Geotechnical Safety and Risk IV* contains the contributions presented at the 4th International Symposium on Geotechnical Safety and Risk, 4th ISGSR, Hong Kong, 4-6 December 2013, which was organised under the auspices of the Geotechnical Safety Network, GEOSNet TC304 on Engineering Practice of Risk Assessment and Management and TC205 on Safety and Management. **Proceedings of the 5th International Young Geotechnical Engineers'**

Conference IOS Press, 2013-08-20 Geotechnical engineers are at work worldwide contributing to sustainable living and to the creation of safe economic and pleasant spaces to live, work and relax. With increased pressure on space and resources, particularly in cities, their expertise becomes ever more important. This book presents the proceedings of the 5th iYGEC International Young Geotechnical Engineers Conference held at Marne la Vallée, France, from 31 August to 1 September 2013. It is also the second volume in the series *Advances in Soil Mechanics and Geotechnical Engineering*. The papers included here cover topics such as laboratory and field testing, geology and groundwater, earthworks, soil behavior, constitutive modeling, ground improvement, earthquake retaining structures, foundations, slope stability, tunnels and observational methods. The iYGEC conference series brings together students and young people at the start of their career in the geotechnical professions to share their experience, and this book will be of interest to all those whose work involves soil mechanics and geotechnical engineering. The cover shows the Dieppe harbour breakwater project. Louis Alexandre de Cessart, 1776-1777, *cole*

Nationale des Ponts et Chaussées Engineering Geology and the Environment Paul G. Marinos, 1997 *Advances in Civil and Structural Engineering Computing for Practice* B. H. V. Topping, 1998 Contains a selection of papers presented at The First International Conference on Engineering Computational Technology and The Fourth International Conference on Computational Structures Technology held in Edinburgh from 18-20 August 1998 **Geotechnical and Geophysical Site Characterization** António Viana da Fonseca, Paul W. Mayne, 2004 Soils and rocks are complex natural geomaterials that exhibit a wide range in strength stiffness state of stress structure and flow characteristics Geotechnical Geophysical Site Characterization provides eleven keynote state of the art papers including the Mitchell Lecture A total selection of 219 technical papers and theme reports address methods of site exploration related to ground exploration for civil engineering and construction works These two volumes represent a collection of experience knowledge regarding various methods of in situ testing geophysical techniques innovative devices improved interpretation algorithms and statistical treatment of field data for the characterization of soils rocks and other geomaterials The papers represent the written records and documented efforts from international experts from industry academe and government who participated in the Second International Conference on Site Characterization held in Porto Portugal on September 20-22 2004 Topics include the utilization of rotary drilling sampling and coring techniques Of particular interest is the variety of in situ tests including standard penetration cone penetration flat dilatometer pressuremeter vane shear piezocone dynamic probes and specialized tools as well as geophysical approaches resistivity surveys surface waves crosshole downhole electromagnetic conductivity and ground penetrating radar A careful and proper site evaluation is required in the analysis and design of new structures construction monitoring and forensic studies that require remediation Many of the contributions relate to case studies of projects that involve shallow foundations drilled shafts pilings slope stability excavations earth dams tunnels and mining Several papers discuss a combined approach using multiple methods and or complementary set of geotechnical geophysical tests to ascertain the characteristics of the ground back cover *Proceedings* ,1994 Scientific Bulletin of the Faculty of Engineering, Ain Shams University ,1992 Proceedings of the ... Asian Regional Conference on Soil Mechanics and Foundation Engineering ,1963 **Proceedings of the International Conference on Soil Mechanics and Foundation Engineering** International Conference on Soil Mechanics and Foundation Engineering, 1969 **A Century of Soil Mechanics: Classic Papers on Soil Mechanics Published by the Institution of Civil Engineers, 1844-1946** ,1969

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