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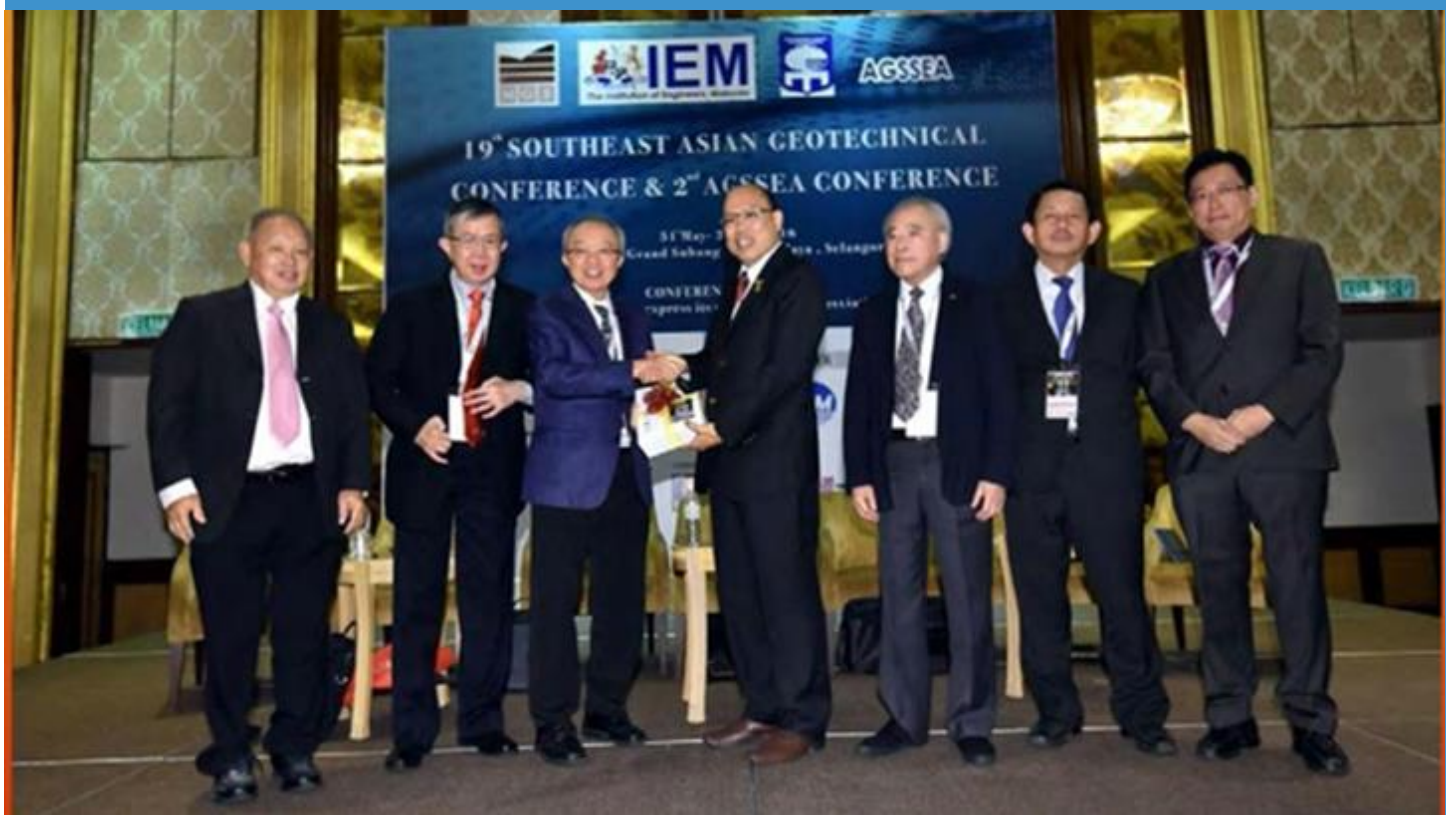

Advances in Geotechnical Engineering in Malaysia for the Last Five Decades

Ir. Dr. Ooi Teik Aun

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Southeast Asian Geotechnical Society, Immediate Past President (1993-1996, 2010-2016)

Association of Geotechnical Societies in Southeast Asia, Chairman (2007 - 2010)

The Institution of Civil Engineers (ICE) – Immediate Past Country Representative for Malaysia (2000 - 2015)

IEM Training Centre Sdn. Bhd – Director (1991 - Present)

IEM Academy Sdn. Bhd – Founder Director (2012 - Present)

IEM CESIG – Founder and Past Chairman (2009 - 2012)

IEM TUSTD – Founder and Past Chairman (2000 - 2003, 2006 - 2009)

WTC2020 – Organizing Chairman (2016 - Present)

GEOTECHNICAL ENGINEERING PRACTICE IN MALAYSIA

Abstract 1: The achievements in geotechnical engineering practice in Malaysia in the past four decades and more are impressive. The developments in the practice from past to present are surveyed. It is hoped to interest existing practitioners, both local and foreign in the current geotechnical practices in the country. Some practitioners are not aware of the records and thus the achievement of past efforts, and this survey, in a small way and the Malaysian Geotechnical Conference held in 2004, MGC 2004 as a whole, in an important way would have redressed this shortcoming. The importance in learning about developments from the past is not only to understand how developments in engineering are traditionally advanced; it will also enhance further efforts at improvements for the future, so that they can be conducted efficiently so as not to repeat the efforts that have been already made in the past. The presentation could be approached from points of view of the Geotechnical Structures, the Ground Deposits or Treatment Techniques. Herein the presentation begins from the point of view of deposition: i.e.: The Ground, in order to give emphasis to the local perspective. Thereafter the various treatment techniques developed for Malaysian conditions are outlined. The original review was published as a keynote address to the MGC2004; this review is updated for the publication of the 40th anniversary of the SEAGS special commemorative volume.

Abstract 2: In the early days of development, engineers used to deal with sites having reasonably good soil conditions. However, due to rapid expansion in housing, infrastructure and utilities developments in the last 30 years, they have no alternative but to utilize less favourable sites such as coastal lowlands, swamps, filled ground, reclaimed land, etc. A number of mega size infrastructure projects such as the construction of the 966-km North-South Expressway, the 179-km electrified double-tracking railway project between Rawang and Ipoh, etc. would have been economically non-viable and/or technically non-feasible if they had been constructed using conventional methods meant for good soil conditions. For these mega projects and other similar projects, it was necessary to explore the innovations of using non-conventional methods when poor soil conditions may impair the integrity and serviceability of the structures. In such situations, the natural condition of poor soil needs to be altered to meet the project requirements. This is termed as ground improvement. The common types of ground improvement used are described in this paper. Due to the increasing awareness of the construction impact on the environment, sustainable construction techniques using ground improvement is also introduced.

Conclusions: Recalling the past 28 years from 1978 to 2006 since ground improvement has been introduced in Malaysia the experience has come of age. The experience gained has increased confidence in ground improvement technology. It presents the engineer a solution to marginal ground - the engineer “forces” the ground to meet the project’s requirements by altering its natural state, instead having to change his design to meet the ground’s limitations. At the same time, it has also increased awareness of its limitations as each technique has its own merits, limitations and economies. Ground improvement requires specialized and intensive engineering input. It requires a more detailed and elaborate site investigation as well as a detailed performance monitoring program. Estimates of bearing capacity and settlements still require post-treatment in- situ tests such as pressuremeter tests, cone penetration tests, plate bearing tests, etc. Instrumentation of soil response still plays an important role in the success evaluation. All these could only increase the technical and economic advantages of ground improvement. The objective of this paper has been to review the opportunities and constraints of each ground improvement techniques; to provide an awareness of “on-site” adaptation of specific design and construction processes to suit the prevailing ground conditions and to provide a brief in-sight into the history and development of ground improvement in Malaysia for the past 28 years.

GEOTECHNICAL CONFERENCES IN MALAYSIA

1975 APRIL 4THSEAGC

1985 AUGUST 8SEAGC

1996 AUGUST 12SEAGC

2000 GEOSYNTHETICS ASIA

2004 MGC2004

2007 MAY 16SEAGC

2016 MAY 19SEAGC - 2AGSSEAC

PRE-1950 STATUS IN MALAYSIA

1. Penang Laboratory 1950s

Soil testing started in Malaysia in 1950s with the construction of Penang airport extension. It was common at that time to carry out site investigation by the use of a mining prospecting tool known as Mackintosh probe. CBR and plate bearing tests were carried out on the runway for the design of runway pavement and the determination of Load Classification Number (LCN).

2. JKR Design Charts 1960s

Mr. S.E Jewkes, the Director of the Design and Research Branch of the Public Works Department (PWD) produced a design chart based on Mackintosh probe tests, soil testings and observations on the performances of existing structures; this chart was further improved by Ting & Ooi with plate bearing tests on Residual Granite Soils (Ooi & Ting, 1975). Ooi, T. A. & Ting, W. H. (1975) The Use of A Light Dynamic Cone Penetrometer in Malaysia Proceedings 4th Southeast Asian Soil Mechanics and Foundation Engineering Regional Conference Kuala Lumpur pp.3-62 to 3-79.

3. JKR HQ Laboratory 1950s

With the construction work of the Subang International airport, Merdeka Stadium and Stadium Negara after the independent of Malaya in 1957, the soil laboratory in Penang was moved to PWD Headquarters in Kuala Kuala Lumpur. Site laboratory was also set up at Subang Airport construction site. Soil stabilizations with cement and lime were carried out at the site with full scale trials. The earthworks at the Subang airport were reported by Skepper, H.G., Rook, H. & Ting, W.H. (1966). Skepper, H.G., Rook, H. & Ting, W.H. 1966. “Earthworks and Pavements for the New International Airport for Kuala Lumpur.” Proc. Inst. of Civil Engineers, December 1966: 561-591.

EARTHWORK CONTROL 1960S SUBANG AIRPORT

It can be said that geotechnical engineering already started in Malaysia before 1967 when the SEAGS was founded by Dr. Moh at AIT. This early start in geotechnical engineering was due to the rapid infrastructure development particularly the development of airport runway and hydropower stations in the then Malaya. Skepper, H.G., Rook, H. & Ting, W.H. (1966)’ work is a historical record of importance of geotechnical engineering in Malaysia at that time.

TIDAL CONTROL STRUCTURE

Paper on the design and construction of tidal control structure by Prof Chin (Chin, 1967) marks the beginning of geotechnical engineering practice in Malaysia that coincide with the founding of the SEAGS and the 1st SEAGC that was held in Bangkok in 1967.

Chin 1967. “The Design and Construction of Tidal Control Structure in Coastal Clay”. Proceedings SEA regional Conference on Soil Engineering, Bangkok pp 261-267.

STATE-OF-THE-ART PAPERS ARE ALSO PUBLISHED IN THE 30TH AND 40TH SEAGS ANNIVERSARY CELEBRATION VOLUMES

In Addition to SEAGS Journal 1970 – 2016 Second Edition CD, Paper Publications can be found in SEAGS Conference Proceedings. State-of-the-Art Papers are also published in the 30th and 40th SEAGS Anniversary Celebration Volumes respectively.

The 40th Anniversary of SEAGS Commemorative Volume Contains Advances in Development, Advancement and Achievements of Geotechnical Engineering in Southeast Asia.

ACHIEVEMENTS IN GEOTECHNICAL ENGINEERING PRACTICE IN MALAYSIA

W.H. Ting Consulting Engineer, Kuala Lumpur

S.F. Chan Consulting Engineer, Kuala Lumpur

T.A. Ooi Consulting Engineer, Kuala Lumpur

Y.W. Yee Geotechnical Specialist, Kuala Lumpur

CD SEAGS Journal 1970 - 2012 First Edition

The Journal publication of the SEAGS started only in 1970. A CD has been produced covering paper publications from 1970 to 2012 by IEM Academy and distributed free to all participants attending the 18SEAGC- 1AGSSEAC in 2013 in Singapore.

The CD divided the papers into:

1970 – 1979 as First Decade

1980 – 1989 as Second Decade

1990 – 1999 as Third Decade

2000 – 2009 as Fourth Decade

2010 – 2012 as Fifth Decade

CD SEAGS Journal 1970 - 2016 Second Edition

Produced by IEM Academy covering:

1970 – 1979 as First Decade

1980 – 1989 as Second Decade

1990 – 1999 as Third Decade

2000 – 2009 as Fourth Decade

2010 – 2016 as Fifth Decade

CONCLUSIONS

ACHIEVEMENTS

The achievements in geotechnical engineering in Malaysia have been shown in the preceding survey to be: Acquisition of the knowledge of the Ground particular to Malaysia.In the area of appropriate Characterization of the deposits. Development in methods of investigation and testing of the ground and constructed foundation, including field measurements and monitoring; both to facilitate characterization of the materials encountered and to ensure sound construction practices and finally. In the technique of treatment and construction of various innovative geotechnical structures to cater for the given Ground condition.

SUSTAINABILITY IN GROUND IMPROVEMENT FOR HOUSING, INFRASTRUCTURE AND UTILITIES DEVELOPMENTS IN MALAYSIA - FROM 1978 TO 2006: K. YEE & T. A. OOI

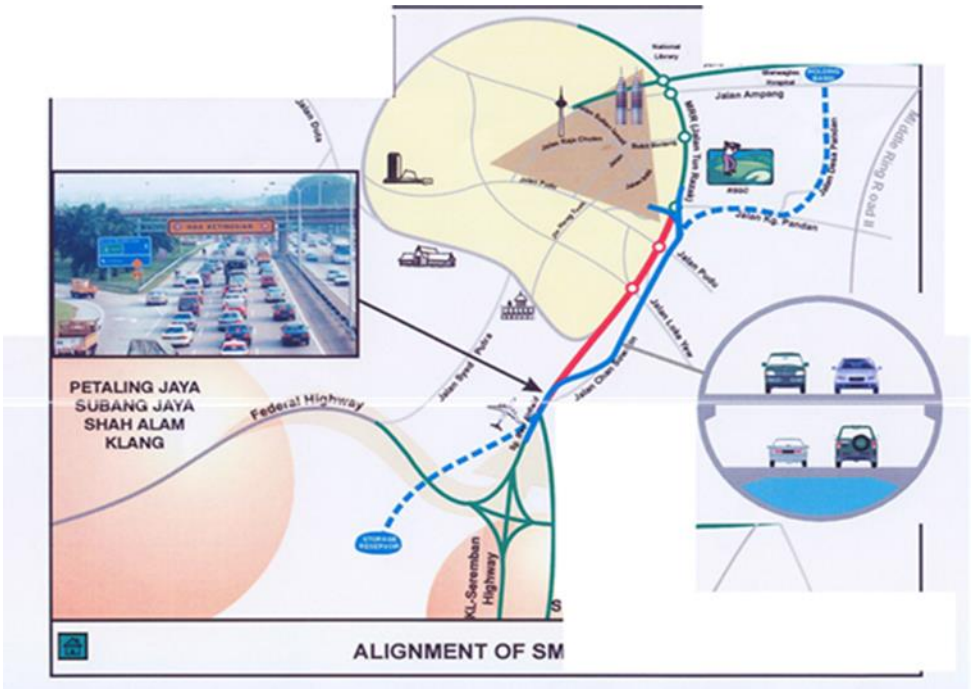
Conclusions: Recalling the past 28 years from 1978 to 2006 since ground improvement has been introduced in Malaysia the experience has come of age. The experience gained has increased confidence in ground improvement technology. It presents the engineer a solution to marginal ground - the engineer “forces” the ground to meet the project’s requirements by altering its natural state, instead having to change his design to meet the ground’s limitations. At the same time, it has also increased awareness of its limitations as each technique has its own merits, limitations and economies. Ground improvement requires specialized and intensive engineering input. It requires a more detailed and elaborate site investigation as well as a detailed performance monitoring program. Estimates of bearing capacity and settlements still require post-treatment in- situ tests such as pressuremeter tests, cone penetration tests, plate bearing tests, etc. Instrumentation of soil response still plays an important role in the success of a ground improvement project. In addition to the benefits of rehabilitation of marginal ground for development, ground improvement is also a sustainable construction method. The future of ground improvement is evidence that it is firmly founded on a path of continuing development with improved equipment, refined methods of analysis, improvement in the field and laboratory testing of soils and objective performance evaluation. All these could only increase the technical and economic advantages of ground improvement. The objective of this paper has been to review the opportunities and constraints of each ground improvement techniques; to provide an awareness of “on-site” adaptation of specific design and construction processes to suit the prevailing ground conditions and to provide a brief in-sight into the history and development of ground improvement in Malaysia for the past 28 years.

WTC 2020

Malaysia wins bid to host tunnel congress in 2020

PETALING JAVA: Malaysia has been chosen as the host for the World Tunnel Congress (WTC) in 2020, beating Australia to the job.At the recent 43rd International Tunnelling and Underground Space Association (ITA) general assembly in Norway, member countries scrutinised the bids with 30 votes given to Malaysia. Australia garnered 22 votes.Announcing the news, Institution of Engineers Malaysia's (IEM) tunnelling and underground technical division chairman Dr Ooi Teik Aun said Malaysia lobbied for both the WTC 2020 and 46th ITA general assembly to be held at the Kuala Lumpur Convention Centre.He added that the event, co-organised with IEM, had the support of the Works Ministry and several private organisations.WTC 2020, which expects 1,200 delegates, will have "Innovation and Sustainable Underground Serving Global Connectivity" as its theme.

IEM is a governing body in Malaysia that serves to promote and advance the science and profession of engineering in any or all of its disciplines and to facilitate the exchange of information and ideas related to engineering. " In line with IEM's mission to create a platform towards nation building and striving to enhance society's consciousness of science and technology, hosting WTC 2020 and ITA general assembly here will be conducive to the attainment of IEM's objectives;" said Ooi.



PRESIDENT AND PAST-PRESIDENTS OF SEAGS

Southeast Asian Geotechnical Engineering Society (SEAGS)

Founder and Past President: Dr. Za-Chieh Moh (1967 – 1973)

Past Presidents:

Professor Chin Fung Kee (1973 – 1975) Malaysia

Prof. Peter Lumb (1975 – 1977)

Dr. Tan Swan Beng (1977 – 1980)

Dr. Edward W. Brand (1980 – 1982)

Dr. Ting Wen Hui (1982 – 1985) Malaysia

Prof. A.S. Balasubramaniam (Bala) (1985 – 1987)

Prof. Seng Lip Lee (1987 – 1990)

Dr. Chin Der Ou (1990 – 1993)

Dr. Ooi Teik Aun (1993 – 1996) Malaysia

Dr. Surachat Sambhandharaksa (1996 – 1999)

Dr. John C. Li (1999 – 2001)

Prof. Kwet Yew Yong (2001 – 2007)

Dr. Chung Tien Chin (2007 – 2010)

Dr. Ooi Teik Aun (2010 – 2016) Malaysia

Dr. Noppadol Phienwej (2016 – 2019)

Association of Geotechnical Societies in Southeast Asia (AGSSEA)

Dr. Za Chieh MOH – Honorary Founder Chairman

Ir. Dr. Teik Aun OOI – Chairman 2007 – 2010

Prof. Kwet Yew YONG – Chairman 2010 – 2016

Prof. San Shyan Lin – Chairman 2016 – 2019

PHOTOS: FROM 4TH SEAGC

4th Southeast Asian Soil Engineering Conference held in Kuala Lumpur in April 1975

Prof. Chin Delivering his Welcome speech at the 8th Southeast Asian Geotechnical Conference Kuala Lumpur in August 1985

Participants at the 8th Southeast Asian Geotechnical Conference held in Kuala Lumpur in August 1985

Prof. Victor DeMello speaking from the Floor

Dr. Za Chieh Moh

MGC Conference 2004

SEAGS & AGSSEA Council Meetings in progress May 2013 Singapore

Group Photo of Organizing Committee with Council Member May 2013 Singapore

19th Chin Fung Kee Memorial Lecture Delivered by Dr Ooi Teik Aun 7th November 2009

23 Chin Fung Kee Memorial Lecture Delivered by Dato' Ir Syed Muhammad Shahabudin
7 December 2013