

Suara SPERUNDING



DASH HIGHWAY RRIM TOLL



ASSOCIATION OF
CONSULTING ENGINEERS MALAYSIA



INTERNATIONAL FEDERATION OF
CONSULTING ENGINEERS (FIDIC)



FEDERATION OF ASEAN
CONSULTING ENGINEERS (FACE)

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Fourth Quarter 2022

2022/2023 Session

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MESSAGE FROM THE PRESIDENT

Dear ACEM Members and Readers, I hope you and your family are safe and well. Welcome to our fourth edition of our Suara Perunding (SP) 2022. As usual, we thank our hard-working Publication Committee and Secretariat for their efforts in publishing the SP quarterly to keep members informed of our activities and provide information on matters of interest.

Firstly, we would like to announce a new coalition of consultants namely between, ACEM, Association of Consulting Architects Malaysia (ACAM) and Association of Consulting Quantity Surveyors Malaysia (ACQSM) to be known as Council of Construction Consultants (CCC). The CCC objectives are to associate together for the purpose of co-operation, mutual benefit and consultation of common matters/issues affecting the members and represent the common views of members in the engagement with the government agencies, stakeholders and relevant organizations. The CCC Terms of Reference was jointly signed by the respective Presidents of the associations at ACEM office on 20th December 2022. We look forward for collaborations between CCC members through dialogues, games, trainings and social activities in 2023. Photos and news regarding “Triple C” are covered in this publication for your reading pleasure.

We have completed the Site Supervision Civil and Structure module webinars in December 2022. The six webinars in this series were all well attended. We shall continue to conduct the rest of the modules webinars next year beginning with the Mechanical module. This quarterly SP edition shall also cover our ACEM course on construction contracts; from the perspective of a consultant, and webinar on construction of Pan Borneo Highway and its challenges.

We hope that members are keeping themselves updated through our website at www.acem.com.my, as our website continues to be an important reference to keep abreast with the current information from various Government organisations and discussion outcomes with Government agencies.

We would like to wish everyone a happy New Year. Make way for a safe, healthy, and prosperous year!

Let us ensure that ACEM is always in the forefront of maintaining the interest of our members in the ***Engineering Consultancy business and industry.***

Thank you and happy reading,

Ir. K. Sundraraj
ACEM President.

New Members
(October - December 2022)

Cessation of Membership
(October - December 2022)

Individuals

October 2022

Name	Date
Ir. Abd Razak bin Abu Hurairah	3 October 2022
Ir. Shamsuriee bin Sulaiman	3 October 2022
Ir. Leong Shian Loong	6 October 2022
Ir. Tengku Mohd Faris bin Tengku Othman	6 October 2022
Ir. Yii Huong Swee	31 October 2022

November 2022

Name	Date
Ir. Yow Jaw Perng	1 November 2022
Ir. Ahmad Hilmi bin Ab Aziz	1 November 2022
Mr. Liew Chee Yoong	1 November 2022
Ir. Lee Swee Yong	21 November 2022

December 2022

Name	Date
Ir. Syed Muhammad Zabeed bin Syed Zakaria	5 December 2022

Panel Member Firms

November 2022

Name	Date
Uniti Consultants Sdn Bhd	14 November 2022

Individuals

October 2022

Name	Date
Ir. Lau Kok Loong	4 October 2022

November 2022

Name	Date
Ir. Lau Win Sang	11 November 2022
Ir. Fong Keng Sin	15 November 2022

December 2022

Name	Date
Ir. Ab' Alim bin Ruslam Ahmad	31 December 2022
Ir. Azful b. Saedon	31 December 2022
Ir. Hj. Azme b. Idris	31 December 2022
Ir. Chan Hong Fatt	31 December 2022
Ir. Irwanddy bin Rosli	31 December 2022
Ir. Lee Jook Mui	31 December 2022
Ir. Mohamad Adif bin Mahmud	31 December 2022
Ir. Mohd Fadil bin Abu Samah	31 December 2022
Ir. Mohd Halim bin Hamidon	31 December 2022
Ir. Norhayati bt Hasan	31 December 2022
Ir. Soo Sui Khen	31 December 2022
Ir. Walter Shee	31 December 2022
Ir. Wedge Hong	31 December 2022
Ir. Wong Lee Cheu	31 December 2022
Ir. Yam Wai Kit	31 December 2022
Ir. Zainal Alam bin Bakar	31 December 2022



WASH HANDS



KEEP DISTANCE



USE SOAP



STAY AT HOME

CORONAVIRUS PREVENTION



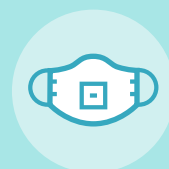
AVOID CROWDS



USE GEL



USE GLOVES



WEAR MASK

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- Construction Tolerances of Small Driven Piles and The Taking of Set

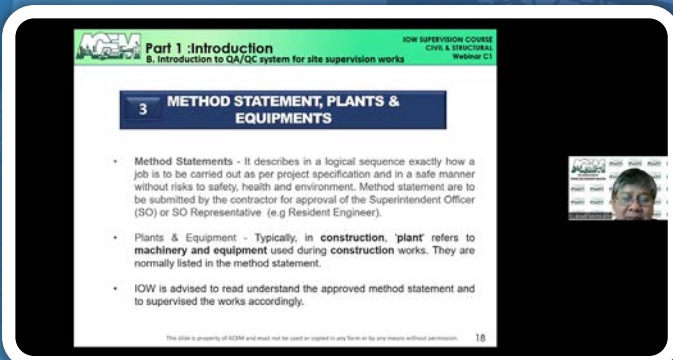


ACEM Webinar Series Site Supervision Course Discipline Module Civil & Structural 2022

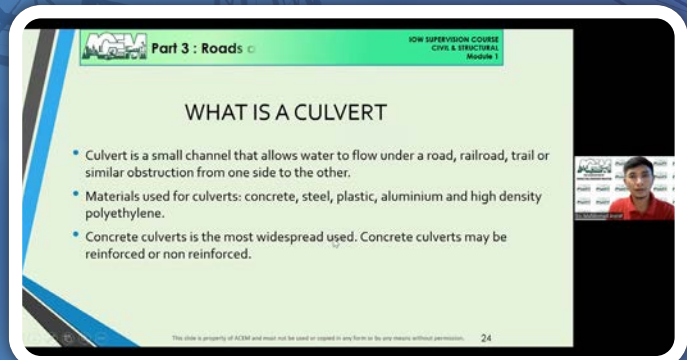
ACEM Webinar Series Site Supervision Course Discipline Module Civil & Structural 2022 was conducted back by popular demand. This course was undertaken first in the year 2021. The module was delivered in 6 webinars from October to December 2022. A

total number of 1100 attended the course. The instructors for the course were Ir. Anuar Mohd Aris, Mr. Muhd Badri bin Abd Karim, Mr. Muhammad Asyraf Azman, Ir. Sin Wai Ho, Ir. P. Punithan, Ir. K. Sundraraj. Most of them have been involved in civil and structural for more than

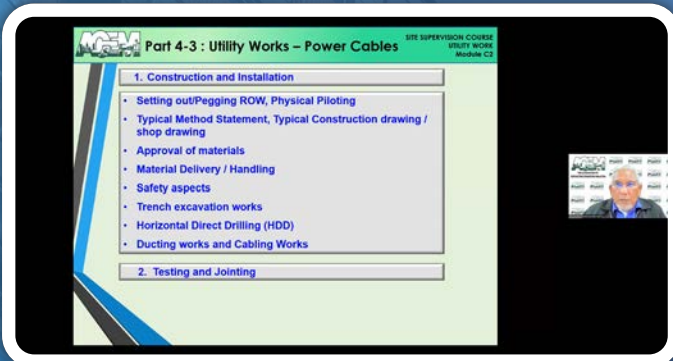
ten years and above. The topic of the course covers Earthworks & Ground Treatment, Roads and drains, Water Supply, Sewerage, Utilities, Concrete Structures, Steel structures, Piling and Foundation, Safety in Supervision, Building Works and Bridgeworks.



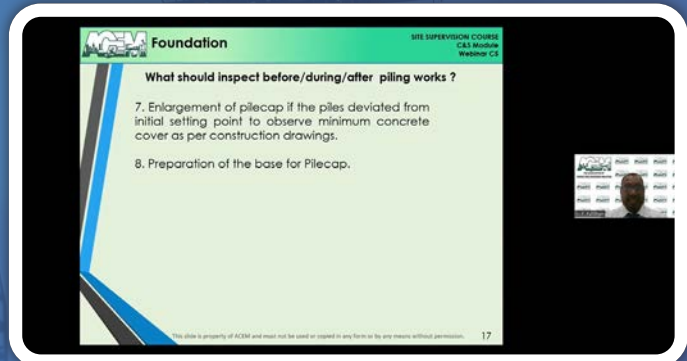
Ir. Anuar Mohd Aris presented his lecture



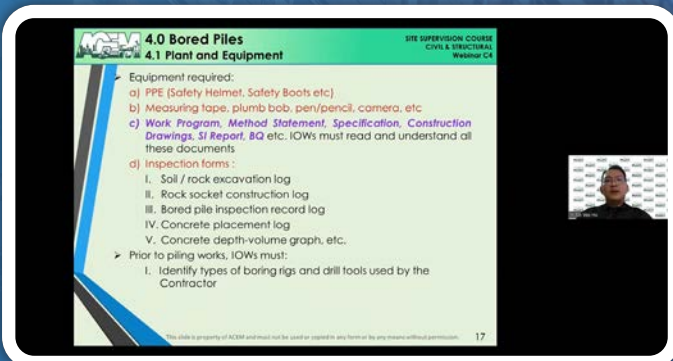
Mr. Muhammad Asyraf Azman presented his lecture



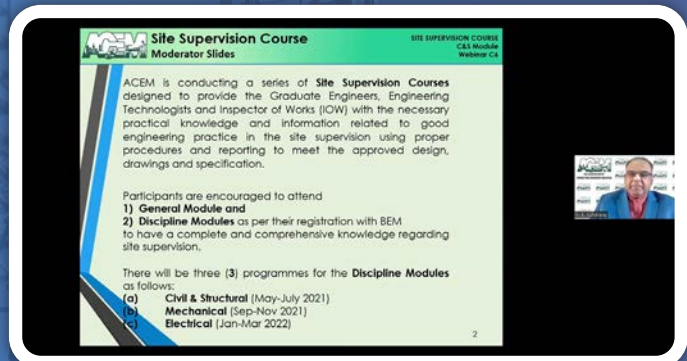
Mr. Muhd Badri bin Abd Karim presented his lecture



Ir. P. Punithan presented his lecture



Ir. Sin Wai Ho presented his lecture



Ir. K. Sundraraj presented his lecture

Webinar On Design and Construction of Geotube® Containment Dyke on Soft Marine Clay

The webinar was held on 27 October 2022 via Zoom Webinar. A total number of 38 participants attended this webinar. The webinar was presented by Ir. Albert Lim who is a professional engineer and is currently the Regional Manager for Tencate Geosynthetics Asia Sdn Bhd. With 25 years of technical experience, he has authored and co-authored more than 30 technical papers for conferences locally and overseas. This webinar purposely to educate and give the information related to design and construction of geotube containment dyke on soft marine clay. For information, the geotextile containment has been used in a wide variety of hydraulic and marine engineering applications for many years. One of its forms is geotextile tubes, which is a long, tubular, sausage-like unit that can be formed in situ on land or in water. The geotextile tubes are made of permeable yet sand tight geotextile which allows hydraulic filling of sand into it. Geotextile tubes are often used for a range of marine engineering

applications including revetments, offshore breakwaters, protection dykes, containment dykes, training walls and groynes. The speaker shared the design methodology of geotextile tubes with reference to three project case studies in Vietnam and Malaysia. The first case study is the usage of geotextile tubes for the construction of Lach Huyen bridge, the longest sea-crossing bridge in Vietnam. The second case study covers geotextile containment dykes constructed for the land reclamation in Deep C 2, part of the Deep C Industrial Zone in Vietnam. Lastly, the third case study explores the land reclamation of Sri Tanjung Pinang 2, Penang. As the geotextile tubes are exposed to an external environment throughout the construction period, it is crucial to ensure the geotextile tubes exhibit high resistance to UV degradation and weathering. The geotextile samples are extracted from respective sites to examine its durability.



Ir. Albert Lim presented his lecture



Ir. Albert Lim (left) and Ir. Liew Shaw Shong

Course on Construction Contracts From the Perspective of a Consulting Engineer

The course was held on 21 and 22 November 2022 at Hotel Armada Petaling Jaya, Selangor. A total number of 68 participants attended this two days course. The speaker for the course is Ir. Oon Chee Kheng. He is an advocate and solicitor of the High Court in Malaya (call: 1995). He is also a Fellow of The Institution of Engineers, Malaysia (IEM), and a Fellow of both Chartered Institute of Arbitrators and Malaysian Institute of Arbitrators and is a registered professional engineer in the civil engineering discipline with the Board of Engineers Malaysia.

The topic of the lectures includes the law and acts related to the engineering field. During the course, the speaker shared many case studies that happened in the past. Most of the case studies occurred within the country. Besides that, the speaker uses two ways of communication with the participants so that they can be asked questions and give thoughts within the course. After the lecture session, participants will be asked by the speaker to ask questions and share their experience with the construction issues.



Ir. Oon Chee Kheng presenting his lecture



The participants who attended the course

ACEM Talk For Practising Engineers 2022

The ACEM talk was held on 12 November 2022 at Amari SPICE Penang, 2, Persiaran Mahsuri, Bayan Baru, 11900 Bayan Lepas Penang. A total number of 13 participants joined the ACEM Talk. The ACEM Talk provides a platform for interaction and networking among fellow consultants to seek views on various practicing issue. The Talk updates participants on current policies and regulations affecting the industry and Professional Indemnity. The Speakers were Ir. Anuar Mohd Aris from Zaidun Leeng Sdn Bhd and Ms. Eileen Lee from Chubb Insurance Malaysia Berhad. The last speaker was Er Gwee Siong Mong from Ronnie & Koh Consultants Pte Ltd who shared experiences relating to remote site supervision in Singapore.



Ir. Anuar presenting a token to Er Gwee Siong Mong



Ir. Anuar presenting a token to Ms. Eileen Lee



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MALAYSIA

18TH ACES-ACEM DIALOGUE



Group photo after the dialogue

The ACES-ACEM Dialogue was held on 12 November 2022 at Amari SPICE Penang, 2, Persiaran Mahsuri, Bayan Baru, 11900 Bayan Lepas Penang. Both ACES and ACEM representatives attended the dialogue. ACEM President Ir. K. Sundraraj opened the dialogue with welcome remarks and an introduction followed by ACES President Er. Chuck Kho. The dialogue's objective is to share the current technology of both countries in the engineering industry. The presenter for the dialogue was Er. Jee Yi Yng from ACES, titled 'Engineering Shaped Singapore And What's Next?' and Ir. Prem Kumar from ACEM, titled 'Adoption of Digitalisation Amongst ECPs in Malaysia'.

In addition, both representatives also discussed issues of common interest, such as attracting talent and retention, cross-border collaboration, e-bidding in consultancy services procurement and challenges in digitalisation in the construction industry. The dialogue was closed by Ir. K. Sundraraj and ended with the group photo. Next, the representatives paid a site visit to the SPICE Convention Centre. Ir. Wong Sik Kwang from Arup Jurunding Sdn Bhd (Penang Branch) briefed and hosted the site visit around the convention centre. The site visit ended with the group photo. At night, the dinner was hosted by ACEM at Citrine, Level 5, Amari SPICE Penang.



Group photo - Site visit



Line up of ACEM Council Member with ACES Executive Committee



Line up of ACES Council Member



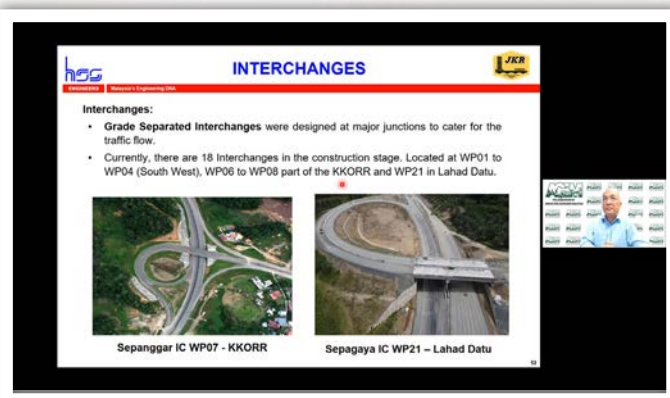
Line up of ACEM Council Member



Webinar on the Construction of the Pan Borneo Highway Sabah (PBHS) and its Challenges



From left Ir. Patrick Augustin, Ir. Ku Adenan bin Ku Ismail and Encik Muhammad Fadzil bin Abdul Hamid



Ir. Ku Adenan bin Ku Ismail presenting his slide



Encik Muhammad Fadzil bin Abdul Hamid presenting his slide

The webinar was held on 29 November 2022 via Zoom Webinar. A total number of 79 participants attended this webinar. The webinar was presented by Encik Muhammad Fadzil bin Abdul Hamid and Ir. Ku Adenan bin Ku Ismail from HSS Integrated Sdn. Bhd. and moderated by Ir. Patrick Augustin. The objective of this webinar is to share the information and its challenges related to the construction of the Pan Borneo highway sabah (PBHS) with the participants. The Government of Malaysia has initiated the Pan Borneo Highway Sabah project to develop a good and well-

connected road network that can further play a major role in creating economic opportunities, and stimulating social development. The Pan Borneo Highway Sabah project will benefit 3.7 million people of Sabah by providing a safe, comfortable and efficient highway, stimulating the development of eco-tourism and further driving economic and social development. The government started this project in April 2016 involving 12 work packages of 224 km. Another 3 work packages have started in October 2021 covering a 60 km road, making 15 work packages under construction with a total

length of 284 km. Among the main challenges of the project are land acquisition issues, soft ground (garinono and soft clay formation) and the relocation of utilities such as electricity and water supply. In addition, issues related to extreme weather, live traffic, lack of construction materials such as sand and bitumen, lack of labour and skilled labour, and material price fluctuations are also challenging for the project team. The movement control order (MCO) during the Covid 19 pandemic has also had a significant impact on the project.

P. Ganendra Scholarship Fund 2022

The P. Ganendra Scholarship, established in 2009, is set up in memory of the late Ir. P. Ganendra, one of Malaysia's leading luminaries in engineering consultancy, had set the pace for the industry's growth in the 1970s through his vision and passion for engineering. The late Ir. P. Ganendra had set up Minconsult Sdn Bhd, one of Malaysia's largest multidisciplinary engineering consultancies. The P. Ganendra Scholarship is set up to assist deserving individuals in pursuing an undergraduate course

in engineering at a local university recognized by the Board of Engineers, Malaysia. The P. Ganendra Scholarship is managed by the Association of Consulting Engineers Malaysia (ACEM) and on behalf of the Ganendra family. This year, 4 applications have been received for three scholarships to be awarded. Based on the qualification criteria and financial constraints of the applicants, the following two students were selected to receive the scholarship:

- Indrajid a/l Nagendran, B.Eng(Civil)(Hons), University Tun Hussien Onn Malaysia, Year 3
- Thivashini a/p Rawi, B.Eng(Civil)(Hons), University Tun Hussien Onn Malaysia, Year 3

The recipients were invited to the ceremony and received the study grant with Council Members on 17 December 2022 at the ACEM office. Both of them received a study grant from YBhg. Dato' Ir. Dr Dennis Ganendra, Chief Executive Officer (CEO) of Minconsult Sdn Bhd. ACEM would like to thank YBhg. Dato' Ir. Dr Dennis Ganendra for attending the ceremony and presenting the study grant to the recipients.



From left Ir. Sundraraj, Ir. Anuar, Ir. Wong Leong Teck, Ir. Foo Kam Fai and Dato' Ir. Dr Dennis Ganendra, with the scholarship recipient, Thivashini & Indrajid (front) .



From left Ir. Sundraraj, Dato' Ir. Dr Dennis Ganendra and Mr. Indrajid.



From left Ir. Sundraraj, Dato' Ir. Dr Dennis Ganendra and Ms. Thivashini.





Inaugural Meeting of The Council of Construction Consultants

This meeting was held on 22 December 2022 at the ACEM office. The opening remarks were addressed by ACEM Presiden, Ir. K. Sundraraj. Three associations collaborated with this Council of Construction Consultants. The meeting was attended by the Association of Consulting Architects Malaysia (ACAM), the Association of Consulting Engineers Malaysia (ACEM) and the Association of Consulting

Quantity Surveyors Malaysia (ACQSM). After the meeting, a memorandum of understanding (MoU) between the three associations was signed by the respective Presidents. ACEM was represented by Ir. K. Sundraraj, while ACAM was represented by Ar. Jafri Merican and ACQSM were represented by Sr Kamarudin bin Sulaiman.



From left Ar. Jafri Merican, Ir. K. Sundraraj and Sr Kamarudin Sulaiman



Meeting session



From left Ir. Romesh, Ir. K. Sundraraj and Ir Chong Chew Fan



Representative from ACQSM



Representative from ACAM



During a meeting session



Ir. K. Sundraraj presenting token to Sr Kamarudin Sulaiman



Ir. K. Sundraraj presenting token to Ar Jafri Merican



From left Sr Kamarudin Sulaiman, Ir. K. Sundraraj and Ar. Jafri Merican



Group photo

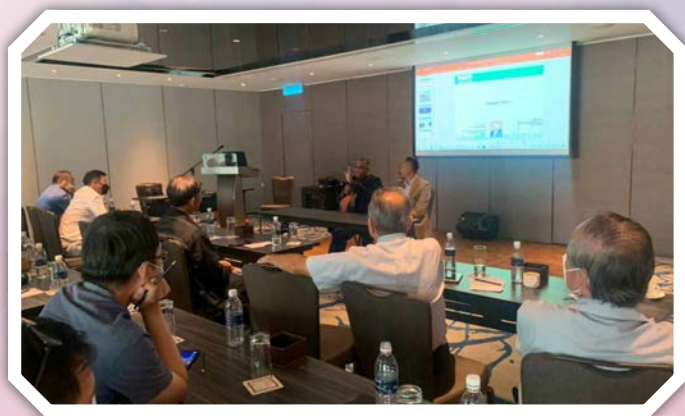
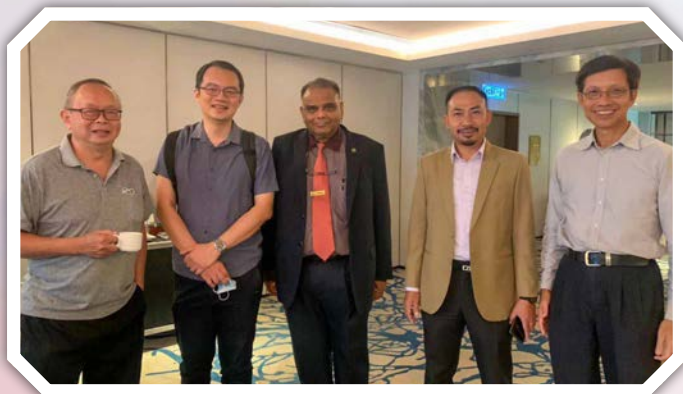
ACEM SABAH DIALOGUE SESSION WITH ACEM PRESIDENT “UPDATE ON CURRENT ISSUES”



Date : 23 September 2022
Venue : Hilton Hotel, Kota Kinabalu, Sabah
Organised by : ACEM Sabah
Attended by : ACEM Sabah Members

The dialogue session was successfully conducted on the 23 September 2022, attended by 21 Sabah Branch members. The ACEM President Ir. K. Sundraraj, has presented following topics in the dialogue session, namely;

1. ACEM/BEM News
2. Consultancy Business Issues
3. Temporary Work



IEM Sabah - SEA - ACEM Sabah Half Day Presentation on “The NEXT Generation of Hydrophilic C-S-H Crystalline Pore Sealing and Crack Healing Technology for Durable, Waterproof and Sustainable Concrete: Characteristics & The Technical Requirement”

Date : 25 November 2022 (Friday)
 Venue : Lintas Platinum Hotel, Kota Kinabalu, Sabah
 Organised by : ACEM Sabah, Sabah Engineers Association (SEA) and IEM Sabah
 Speakers : Mr. John Fiorino-Active Partner (Krystalline Technology SL, Spain) &
 Mr. C H Fong-General Manager (KMK Krystalline Sdn. Bhd, Malaysia)

2 topics were presented in the event which are;

1. The NEXT Generation of Hydrophilic C-S-H Crystalline Pore-Sealing and Crack Healing Technology for Durable, Waterproof and Sustainable Concrete
2. The Technical Requirement of Using the NEXT Generation of Hydrophilic C-S-H Crystalline Pore Sealing and Crack Healing Technology for Durable, Waterproof and Sustainable Concrete.





ACEM SABAH DINNER YEAR 2022 “EMBRACING DIGITAL TRANSFORMATION”

Date	:	24 September 2022
Venue	:	Port View Palace Hall, Dewan Hakka, Tanjung Lipat, Kota Kinabalu, Sabah
Guest of Honour	:	YAB Datuk Seri Panglima Haji Hajiji Haji Noor, The Chief Minister of Sabah
Dress Code	:	Traditional Attire
Organised by	:	ACEM Sabah
Attended by	:	ACEM Sabah Members and guests

After 2 years being postponed due to the pandemic, ACEM Sabah has successfully organised its Biennial Dinner on 24 September 2022. In line with this year's theme of “Embracing Digital Transformation”, ACEM Sabah has produced its first Dinner e-Magazine which was made available through QR Code on the dinner ticket. Graced by the Guest of Honour, the Chief Minister of Sabah which

was represented by Datuk Dr. Joachim Gunsalam, Sabah Deputy Chief Minister cum Minister of Industrial Development, with attendance of more than 500 members and guests, the event was made livelier with entertainments, lucky draws, the presentation of ACEM Sabah Education Incentive Awards to recipients and the presentation of the Best Attire for the night.



ACEM SABAH BRANCH DINNER 2022 EMBRACING DIGITAL TRANSFORMATION



EMBRACING DIGITAL TRANSFORMATION

Datuk Seri Pehin Dato' Haji Haji Noor

24 September 2022 | The Right Honourable Pehin Dato' Haji Haji Noor, Tanjong Lipat



Courtesy visit to new Permanent Secretary MIPD

A delegate from ACEM (Sarawak Branch) had paid a courtesy visit to new Permanent Secretary, Ministry of Infrastructure and Port Development/MIPD Sarawak, Mr. Chiew Chee Yau at his office, Baitul Makmur, Petra Jaya, Kuching on 3rd October 2022. The visit was to discuss on the PMC issues. The delegate was led by Branch Chairman, Ir. Wong Leong Teck and ACEM members.



A presentation souvenir from Ir. Wong Leong Teck (Chairman) to Mr. Chiew Chew Yau (Permanent Secretary MIPD)



A group photo of Mr. Chiew (Permanent Secretary MIPD) with the ACEM (Sarawak Branch) delegate

Half day Seminar on "Geosynthetics Solution for Hydraulic & Marine Application"

The Association of Consulting Engineers Malaysia (Sarawak Branch) in collaboration with TenCate Geosynthetics/Tradimas organised a half day seminar on "Geosynthetics Solution for Hydraulic

& Marine Application" on 13th October 2022 at Lot 10 Boutique Hotel, Kuching. Mr. Tan Jun Yuen & Mr. Siew Kok Hau were the speakers from TenCate Geosynthetics.



Presentation souvenir to Ir. Wee (Tradimas)



Presentation souvenir to Mr. Tan Jun Yuen (speaker)



Presentation souvenir to Mr. Siew Kok Hau (speaker)



The view of participants attending the seminar

Ministry of Public Health, Housing and Local Government Sarawak : Amended Sarawak Building Ordinance (SBO), 1994



The view of the stakeholders attending the meeting

The ministry invited the Association of Consulting Engineers Malaysia (Sarawak Branch) to attend the 2 days meeting on “Amended Sarawak Building Ordinance (SBO) 1994 which was held on 19 – 20th October 2022 at the ministry’s office, Bangunan Baitul Makmur 1, Petra Jaya, Kuching. Ir. Hii Tiong Koon attended the meeting.

Dialogue on “SEB Engagement 2022”



A group photo of participants attending the SEB dialogue

The Sarawak Energy Berhad/SEB organised a dialogue on SEB Engagement 2022 on 2nd November 2022 at Sarawak Energy Berhad’s office, Menara Sarawak Energy Kuching. Ir. Wong Leong Teck, Ir. Ng Joon Kiat, Ir. Ts. Jarvis Ling, Mr. Kho Soh Koon, Mr. Bong Eng Hui and Mr. James Kong attended the dialogue.

Collaboration workshop with Swinburne University of Technology Sarawak

The Swinburne University of Technology Sarawak in collaboration with the Association of Consulting Engineers Malaysia (Sarawak Branch) organised an one day workshop on Road Lighting Design on 6th December 2022 at Swinburne University’s computer laboratory, Kuching. The speakers were Ms. Lim Swee Yoong and Ir. Ts. Jarvis Ling.



The view of participants attended the workshop

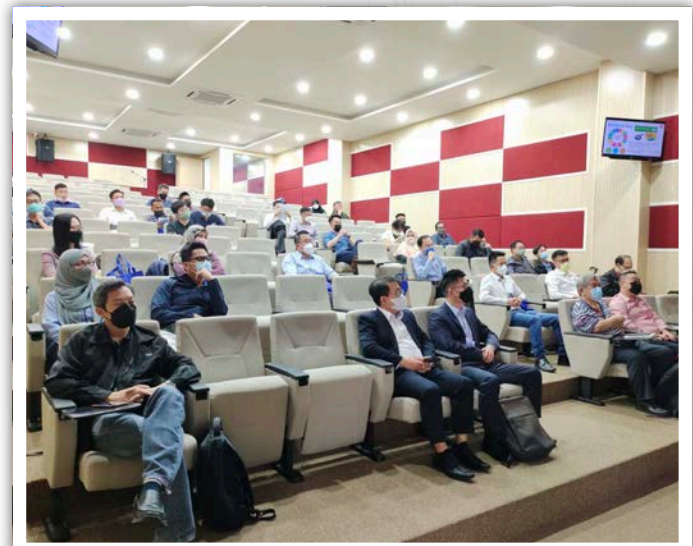


Seminar on Future Electrical Infrastructure to Cater for Electric Vehicle Charging System

The Electrical and Electronics Association of Malaysia (TEEAM) and the Institution of Engineers, Malaysia (IEM) successfully co-organised a Seminar on “Future Electrical Infrastructure to Cater for Electric Vehicle Charging System” on 26 September 2022 at Wisma IEM HQ, Petaling Jaya. The highly insightful Seminar which drew an attendance of more than 70 participants, was supported by the Association of Consulting Engineers Malaysia (ACEM), Institution of Engineering Technology Malaysia (IET) & Technological Association Malaysia (TAM).

The Seminar opened with a Welcome Address by TEEAM President, Mr Siew Choon Thye. In his insightful speech, Mr Siew highlighted that climate change is a very serious issue whereby the United Nations (UN) has set the Framework of 17 Goals, 169 Targets and 231 Indicators to stress to all the members states on the immediate actions required to address this threat. The UN preliminary data shows that global CO₂ emission 2022 (January to May) are 1.2% above the record of 2019 and it is predicted for the next 5 years to be 1.1°C to 1.7°C higher than the pre-industrial level. Therefore, the fossil fuel emission is now above the pre-pandemic level and thus the noble ambition of Emission Reduction Pledges for 2030 need to be 7 times higher—in order to be in line with the 1.5°C goal of the Paris Agreement 2015. Electric Vehicles (EV) are gaining more and more popularity worldwide as people are becoming more concerned about climate change. EV is known for being environmentally-friendly and it is hoped that it will become more economical in the long run.

As announced in Malaysia's Budget 2022, our Government is pro-actively promoting EV by providing incentives for EV to be completely exempt from import duty, excise duty and road tax. This is indeed welcome news for all. In a bold move, countries such as Singapore, the United Kingdom and France have announced their target to ban gasoline and diesel vehicles by 2040, moving towards EV instead. Current challenges that hindered the widespread adoption of EV worldwide include: there are different standards of chargers, i.e., European, Japan, U.S.A. and China, and also different types of EV charger connectors that are not compatible for all EVs. Besides, there are also challenges in battery technology development by different manufacturers and the country's electrical infrastructure which is currently unable to cater for EV-charging electrical demands.





The Seminar mainly highlighted the challenges and solutions for future electrical infrastructure concepts in order to cater for sudden increase of electrical loads due to the EV Charging System. Speakers introduced a viable solution using Solar PV System to cater for the increase of electrical loads due to EV charger, in order not to over-burden the Tenaga Nasional Berhad(TNB) grid, and also to provide stable power supply using the Energy Storage System (ESS), since Solar PV power output will vary due to irradiance and temperature.

The Seminar was dedicated to cover a wide spectrum of the following topics:

1. Guide for Electric Vehicle Charging System, by Ir. Sharal Aida bt Ibrahim, Suruhanjaya Tenaga(Energy Commission);
2. Challenges & Solutions for Additional Power Demand due to Electric Vehicle Charging System, by Mr Chin Soo Mau, CEO of Pekat Group Berhad;
3. How Solar PV & Energy Storage System Support Electric Vehicle Charging System, by Mr Cobe He, Regional Technical Consultant of Sungrow Power Supply Co., Ltd.;
4. Electric Vehicle Charging Infrastructure and Standards in Malaysia, by Ir. Lee Yuen How, Chairman of EV Charging Industry Association in Malaysia; and
5. Eco-Structure EV Charging Expert, by Mr Frankco Nasarino, Product Manager, Schneider Electric.

The Seminar was approved with BEM 7 CPD hours and CIDB 10 CCD points. It was well organised and seamlessly co-ordinated by TEEAM's Professional Development & Events Committee Chairman, Ir. Lee Kok Chong, and IEM Electrical Engineering Technical Division Chairman, Dr. Siow Chun Lim. With IEM Secretariat Ms Aisyah and TEEAM Secretariat Ms Thila's praiseworthy assistance during registration of participants and arrangement of speakers' presentations, the highly insightful Seminar was conducted smoothly. Congratulations!



Dr. Arkam with his award & certificate.

First Chartered Association of Building Engineer (CABE) Building Engineer of the Year!

ACEM is delighted to congratulate our Council Member, Adj. Prof. Ir. Dr. Muhammad Arkam Bin Che Munaaim who has been chosen as the first ever Chartered Association of Building Engineer (CABE) Building Engineer of the Year. At an award ceremony held in Wales, UK, the accolade was presented to Ir. Dr. Muhammad Arkam by CABE President Joseph Birt FCABE, in recognition of his outstanding work delivering a competency assessment tool for construction personnel.

His work on the project has changed the landscape of competency-based assessment in Malaysia, improving the competency of construction professionals and enabling them to build more sustainable, better performing, and innovative buildings. His dedication to competency, something that is so deeply rooted into CABE's values, is why the award panel chaired by Lord John Lytton, chose to honour him with this award. Congratulations again to Adj. Prof. Ir. Dr. Muhammad Arkam bin Che Munaaim for the award received.

Construction Tolerances of Small Driven Piles and The Taking of Set

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1.0 CONSTRUCTION TOLERANCES OF DRIVEN PILES

The construction tolerances given in specifications does not differentiate piling tolerances against the size of piles to be used in a foundation or a pile group sharing the same pile cap.

1.2 The smallest driven pile is made of timber with dimension of 125mmx125mm pressure-treated timber piles. The smallest reinforced concrete (RC) version is 150mmx150mm square. There was a time when even smaller piles were used however the instillation process was by jacking.

1.3 The predominant use of these small piles is seen in the construction of houses and low rise apartments where low capacity pile loads in the region of 25 tons in the case of RC piles .

1.4 Pile caps and pile group designs in these facilities assume that all loads are vertical with few exceptions of lateral loads are not factored into the design. Small piles in groups can be overloaded when piles are eccentric within the accepted tolerances.

1.5 Regardless of RC driven pile size the standard minimum spacing of 3 x pile perimeter is observed. The 3 x pile perimeter has become 3 x pile dimension.

1.6 When ground beams are provided , their main purpose is to tie the pile caps together and not used as corrections to recentre the pile group to the column above.

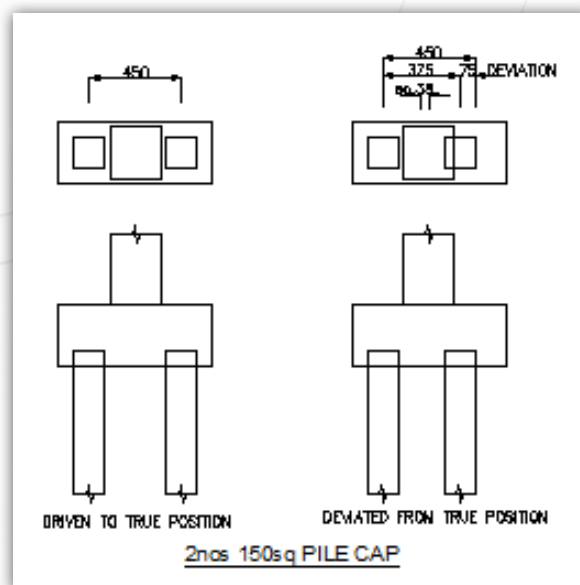
2.0 ILLUSTRATION OF THE POTENTIAL PROBLEMS

2.1 Pile are permitted to deviate from its intended position by as much as 75mm.

2.2 Ambiguity shall be avoided by specifying as in BS8004, piles “ should not deviate by more than 1 in 75 from the vertical, or more than 75mm from their designed position at the level of the piling rig.”

2.3 Three types of pile groups for 150mms square RC piles will be used in the illustration. Each pile is assumed to have been designed to support 25tons.

2.4 Two-pile group are perhaps more common.



2.4.1 The pile deviation is shown in only one direction. Calculation will show with even this “minor” deviation the maximum load is 30 tons. The allowable load has been exceeded by 20%.

2.4.2 The difference between the maximum and minimum load that has been shed onto the pile will cause greater settlement and larger bending in the pile cap.

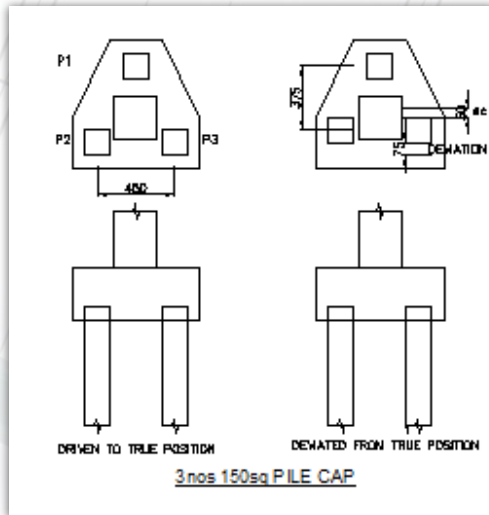
2.4.3 For illustration the deviation shown is in the axis of the pile centre line. When displaced laterally as well as horizontally the additional factor to be considered is the induced torsion.

2.4.4 JKR piling specifications suggest that deviations in two directions are permitted, “For a pile cut-off at or above ground level, the maximum permitted deviation of the pile centre from the centre points shown in the Drawings shall not exceed 75mm in any direction.”

2.4.5 BS 8004 has tighter language in the specifications, "Driven and cast-in-place, and bored and cast-in-place piles should not deviate by more than 1 in 75 from the vertical, or more than 75mm from their designed position at the level of the piling rig."

2.5 Three pile group 150 square pile

2.5.1 The 3 pile group is more sensitive when the piles marked as P2 and P3 deviate from its intended position.

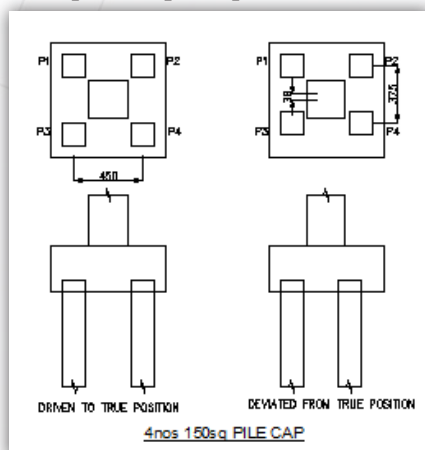


2.5.2 Pile P1 is overloaded considerably. Calculation shows that pile P1 now supports 30.9 tons. This is a 23.6% increase in the allowable capacity. Similarly when P1 deviates by 75mm, P2 and P3 now supports 30.9tons.

2.5.3 When Pile P1 is eccentric by 75mm it itself becomes overloaded by 23.6%.

2.5.4 It can also be shown that when pile spacing is made 4 x pile dimension the overstress due to permissible eccentricity becomes progressively less. When Pile P3 deviates by 75mm in this 4D arrangement, the maximum overload is 16.4%.

2.6 Four Pile Group 150 square pile



2.6.1 As the pile group becomes larger, the effects of pile deviation is less severe than the case of the 3-pile group. Calculations show that when a pair of piles deviate the maximum load is 30 tons. The effect on the pile cap is nonetheless severe.

2.7 Three pile group 200 square pil

2.7.1 Repeating this exercise for a 200 square 3 pile group with maximum applied load 1,200kN, The effect of allowable eccentricity on the standard spacing of 3-d, the increase in maximum pile load is 16.7%.

3.0 REVIEW OF PILE SPACING FOR SMALL DIMENSION PILES

3.1 While this technical note addresses small piles, it is noteworthy that pile deviation can be a serious cause of concern. "Accordingly, codes of practice specify tolerances in the position of pile heads or deviations from the vertical or intended rake. If these are exceeded, action is necessary either to redesign the pile caps as may be required or to install additional piles to keep the working loads within the allowable values", PILE DESIGN and CONSTRUCTION PRACTICE, Fourth edition, M.J.Tomlinson, CEng, FICE, FISTructE.

3.2 When small piles are specified a review of the minimum distances between pile centres should be undertaken. This is necessary to determine the sensitivity of unintentional increased loads versus the maximum tolerable limits of specified working load.

3.3 The piles in the three (3) pile group is very sensitive to overstress when piles are driven to even within allowable deviations.

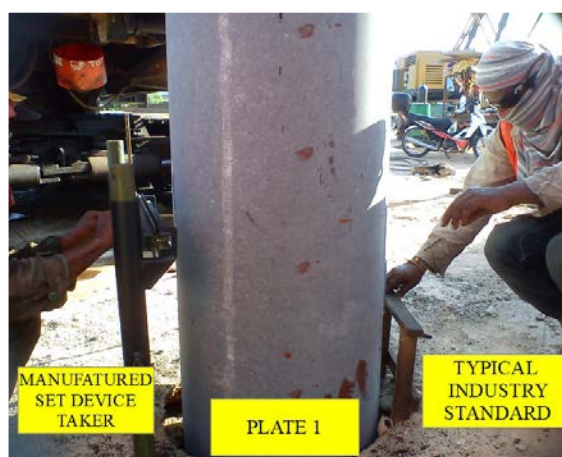
3.4 The designer has the recourse of designing with greater pile spacing and or de-rate the pile capacity to a lower value to cater for the anticipated increase in pile load due to unintentional deviations.

3.5 Small Piles-Geotechnical Capacity Small piles support applied loads predominantly by skin friction unless driven into very hard strata at shallow depths.

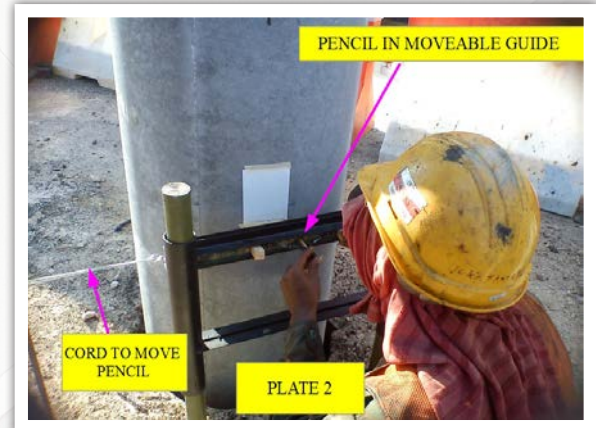
- 3.6 To cater for deviated piles the designer may have little choice but to add to the pile group when piles are specified to maximum allowable.

4.0 MEASUREMENT OF PILE SET

- 4.1 Measurement of pile set is made when driven piles are used to determine end of piling. The measurement of pile set is useful when it can be correlated to maintained load test (MLT) as a quick measure of pile geotechnical capacity.
- 4.2 The taking of set during the end of pile driving is a necessity for determination of projected pile geotechnical capacity as driven. This would be correlated with maintained load test that had been carried out as part of the foundation design for a project.
- 4.3 The means of measuring set at the end of pile driving is very crude. The worker taking the set has to be very close to the falling hammer. It is hazardous.
- 4.4 A device was manufactured by Mr See Fan of See Yong & Son Construction Sdn Bhd (SYS) on a design made by Perunding FAISAL, ABRAHAM dan AUGUSTIN sdn. bhd. It was used in the field and found to work satisfactorily. It could be operated a distance of 1~2m away from the falling hammer and pile face.



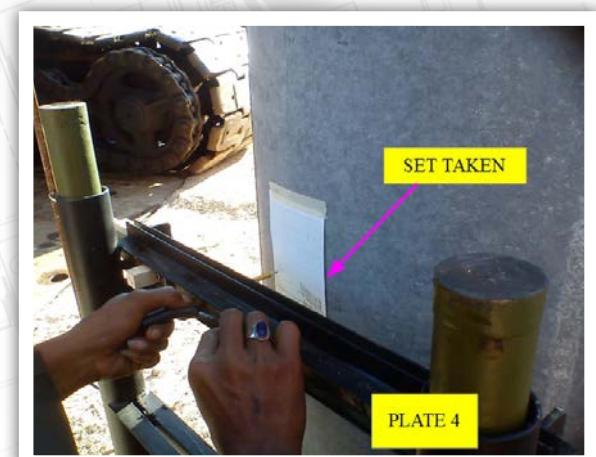
- 4.4.1 In Plate 1, the industry standard is a crude device with pencil resting on 2 x 1 timber with no restraint to vertical direction. Furthermore the crude bench sits inside the zone where the soil will interfere with data collected.



- 4.4.2 Plate 2 shows the manufactured device with cord to move pencil guide sideways, pencil in a guide with an elastic restraint to exert even pressure of pencil tip on record paper.



- 4.4.3 Plate 3 shows a contrast of the devices. The industry standard shows no restraint to pencil in the vertical direction. This gives room for manipulation during data acquisition.



- 4.4.4 Plate 4 shows successful taking of set with little outside interference.

4.4.5 The set and temporary compression measurements are more reliable when using a properly manufactured device with reduced chance of operator interference. As shown above the various pile driving formulae depends on the pile set. The most commonly used in Malaysia is the Hiley Formulae which is a derivative of the Modified ENR 1965 method. Hiley and other dynamic formulas are shown below.

Method	Equation, R_u	Remarks
ENR, 1893	$\frac{E_h}{S + C}$	$C = f$ (type of hammer)
Modified ENR, 1965	$\frac{1.25e_h E_h}{S + C} \cdot \frac{w_r + n^2 w_p}{w_r + w_p}$	$C = f$ (type of hammer)
Eytelwein, 1961	$\frac{E_h}{S} \cdot \frac{w_h}{w_h + w_p}$	
Gates, 1957	$a\sqrt{e_h E_h} (b - \log S)$	a & b = empirical factors
Janbu, 1967	$\frac{e_h E_h}{k_u S}$	$k_u = f(w, w_p, A, L, E, e_h, S)$
Hiley, 1961	$\frac{e_h E_h}{S + 0.5(C_1 + C_2 + C_3)} \cdot \frac{w_r + n^2 w_p}{w_r + w_p}$	$C_1 = f$ (driving stress, cushion condition) $C_2 = f$ (driving stress, type of piles) $C_3 = f$ (driving stress)

E_h : hammer energy, S : pile's set per blow, e_h : hammer efficiency, w_r : weight of hammer ram
 w_p : Pile weight, n : coefficient of restitution, A : cross section of pile, L : pile length, E : modulus of elasticity

4.5 Whilst the piling formulae are used as a means of determining pile ultimate capacity, an inexpensive device that measure the set accurately is required. The prototype described can be improved.

REFERENCES

1. STANDARD SPECIFICATIONS FOR BUILDING WORKS (2005 Edition) JKR20800-132-23
2. PILE DESIGN and CONSTRUCTION PRACTICE Fourth edition M.J.Tomlinson, CEng, FICE, FStructE
3. BS8005 : 2015 Code of Practise for Foundations
4. Piling Positional Tolerances
A) PILE DESIGN and CONSTRUCTION PRACTICE Fourth edition M.J.Tomlinson, CEng, FICE, FStructE

pages 96-97

3.4.11 Positional tolerances

It is impossible to install a pile, whether by driving, drilling or jacking, so that the head of the completed pile is always exactly in the intended position or that the axis of the pile is truly vertical or at the specified rake. Driven piles tend to move out of alignment during installation due to obstructions in the ground or the tilting of the piling frame leaders. Driving piles in groups can cause horizontal ground movements which deflect the piles. In the case of bored piles the auger can wander from the true position or the drilling rig may tilt due to the wheels or tracks sinking into soft ground. However, controlling the positions of piles is necessary since misalignment affects the design of pile caps and ground beams (see 7.8 and 7.9), and deviations from alignment may cause interference between adjacent piles in a group or dangerous concentrations of load at the toe (Figure 5.7). Accordingly, codes of practice specify tolerances in the position of pile heads or deviations from the vertical or intended rake. If these are exceeded, action is necessary either to redesign the pile caps as may be required or to install additional piles to keep the working loads within the allowable values.

Some codes of practice requirements are as follows:

BS 8004: Driven and cast-in-place, and bored and cast-in-place piles

should not deviate by more than 1 in 75 from the vertical, or more than 75mm from their designed position at the level of the piling rig. Larger tolerances can be considered for work over water or raking piles. A deviation of up to 1 in 25 is permitted for bored piles drilled at rakes of up to 1 in 4.

BS Code of Practice for Maritime Structures: A deviation of up to 1 in 100 is permitted for vertical piles driven in sheltered waters or up to 1 in 75 for exposed sites. The deviation for raking piles should not exceed 1 in 30 from the specified rake for sheltered waters or 1 in 25 for exposed sites. The centre of piles at the junction with the superstructure should be within 75mm for piles driven on land or in sheltered waters. Where piles are driven through rubble slopes the code permits a positional tolerance of up to 100mm, and for access trestles and jetty heads a tolerance of 75mm to 150mm is allowed depending on the exposure conditions.

Institution of Civil Engineers(2.1): Positional—Maximum deviation of centre point of pile to centre point on drawing not more than 75mm, but additional tolerance for pile cut-off below ground level. Verticality—pile to be made vertical within tolerance of 1 in 100 at commencement of installation. Maximum deviation of finished pile from the vertical is 1 in 75. For raking piles set pile to within 1 in 50 at commencement of installation. Maximum deviation of finished pile from the specified rake is 1 in 25 for piles raking up to 1:6 and 1 in 15 for piles raking more than 1:6. Relaxation permitted in exceptional circumstances subject to implications of this action.

D.T.U. No 13.2 (France): A maximum positional tolerance of 150mm is permitted, but the code states that it is normally expected that driven piles and cased bored piles can be installed to a tolerance of 60mm. Ordinary bored piles, including auger piles, are expected to be installed to a tolerance of 120mm. The axis of an isolated pile must not deviate by more than 3%. The axis of a pile in a group must not deviate by more than 2% if the inclination of all piles in the groups is in the same direction.

New York City Building Code: If the axis deviates by more than 4% from plumb or the specified rake the foundation design shall be modified to resist the resulting vertical and lateral forces. A tolerance of 75mm for the designed location is permitted without a reduction in the load capacity of a group. Where piles deviate by more than this amount the true loading is determined by taking into account the eccentricities as observed from a survey of the actual pile head positions. If the calculated load on any pile is in excess of 110% of the allowable load capacity, a correction is made by installing additional piles or by other methods of redistributing pile loads to reduce the maximum pile load to not more than 110% of the allowable capacity.

American Concrete Institute Recommendations: The position of the pile head is to be within 75 to 150mm for the normal usage of piles beneath a structural slab. The axis may deviate by up to 10% of the pile length for completely embedded vertical piles or for all raking piles, provided the pile axis is driven straight. For vertical piles extending above the ground surface the maximum deviation is 2% of the pile length, except that 4% can be permitted if the resulting horizontal load can be taken by the pile-cap structure. For bent piles the allowable deviation is 2% to 4% of the pile length depending on the soil conditions and the type of bend (e.g. sharp or gentle). Severely bent piles must be evaluated by soil mechanics' calculations or checked by loading tests.

The significance of positional tolerance to piling beneath deep basements is noted in Section 5.9.

B) JKR/SPJ/2010-S10

SECTION 10 – PILING WORKS

10.2.2 Position

For a pile cut off at or above ground level the maximum permitted deviation of the pile centre from the centre points shown on the Drawings shall not exceed 75 mm in any direction. For a pile cut off below ground level an increase in this tolerance of 150mm is permitted in accordance with Sub-Sections 10.2.3 and 10.2.4 herein below.



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