

The Bulletin of the American Concrete Institute – Malaysia Chapter (e-Bulletin)



MyConcrete:

The Bulletin of the American Concrete Institute – Malaysia Chapter

Editor:

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Editorial Note

We are pleased to present the third issue of volume twelve of MyConcrete bulletin, the official bulletin of American Concrete Institute – Malaysia Chapter (ACI – Malaysia Chapter). The bulletin publishes latest research and case studies conducted in academia and industries for the concrete industry professional.

As usual this issue also contains three articles, i.e., industry article, technical report, and a case study. The first article reports an industry article that reports the valuable information on pigmented concrete façade. It provides some examples of pigmented concrete façade around the world including Malaysia. The second paper is a technical report based on the research in academia. It focuses on the behavior of reinforced concrete beam strengthened with prestressed fiber reinforced polymers (FRPs). The strengthening mechanism of different ways of prestressing and some real-life examples of the system are reported in the article. Lastly, a case study contributed by Mapei Malaysia Sdn. Bhd. The article is based on the structural assessment of Kuantan Port, a multipurpose port in the East Coast Region of Peninsular Malaysia, situated about 25 km to the north of Kuantan city and facing the South China Sea. The port infrastructures suffered from deterioration due to reinforcement corrosion and subsequent spalling of concrete cover. The assessment was done to provide total solution for repairing the concrete infrastructures in the port using Mapei products. The editorial team believes these articles provides valuable insights for the concrete industry professionals. We would like to thank the contributors of the articles for this issue of MyConcrete bulletin.

The editorial team would like to thank CRT Specialist (M) Sdn. Bhd. for sponsoring this issue as a premium sponsor. We also would like to thank, who is our loyal sponsor Adept Technical Services Sdn. Bhd.

We would like to invite concrete industry professionals and researchers to contribute articles for the upcoming issues of MyConcrete bulletin. The sponsorship for upcoming issues is also open for the concrete industries. We hope to get more sponsorship for the upcoming issues.

Thank you very much for your reading.

Dr. A. B. M. Amrul Kaish

Editor, MyConcrete Bulletin

Errata: In the previous version of this bulletin, the name of the port was misspelled as Port Klang in the editorial. It should appear as Kuantan Port. We have corrected it in this version of the bulletin. The editorial team apologizes for this mistake.

Introduction to ACI Malaysia Chapter

American Concrete Institute - Malaysia Chapter (ACI-Malaysia) is a non-profit technical and educational society representing ACI Global in Malaysia, which is one of the world's leading authorities on concrete technology. Our members are not confined to just engineers; in fact, our invitation is extended to educators, architects, consultants, corporate, contractors, suppliers, and leading experts in concrete related field. The purpose of this Chapter is to further the chartered objectives for which the ACI was organized; to further education and technical practice, scientific investigation, and research by organizing the efforts of its members for a non-profit, public service in gathering, correlating, and disseminating information for the improvement of the design, construction, manufacture, use and maintenance of concrete products and structures. This Chapter is accordingly organized and shall be operated exclusively for educational and scientific purposes.

Objectives of ACI-Malaysia are:

- ❖ ACI is a non-profitable technical and educational society formed with the primary intention of providing more in-depth knowledge and information pertaining to the best possible usage of concrete.
- ❖ To be a leader and to be recognized as one of Malaysia's top societies specializing in the field of concrete technology by maintaining a high standard of professional and technical ability supported by committee members comprising of educators, professionals and experts.
- ❖ Willingness of each individual member/organization to continually share, train and impart his or her experience and knowledge acquired to the benefit of the public at large.

Past Presidents

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2004 - 2006: Mr. Seow Aik Guan
2006 - 2008: Ir. Boone Lim
2008 - 2010: Ir. Parnam Singh
2010 - 2012: Ir. Ng Kok Seng
2012 - 2014: Dr. Zack Lim
2014 - 2016: Dr. Zack Lim
2016 - 2018: Ms. Serina Ho
2018 - 2020: Dr. Sudharshan N. Raman
2020 - present: Mr. Martin David



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Committee Biodata



Mr. Oscar R.H Teng

Head of Media Committee

Mr. Oscar is a specialist in concrete/cementitious decorative and facade mixture. To be specific, Mr. Oscar focuses on Glass Fibre Reinforced Concrete (GFRC) and other light weight concrete facade. Graduated from Monash University in Bach. Civil and Environmental Engineering, his goal is always to create concrete that can beautify the current dull concrete jungle of city life. With 5 years of experiences in Concrete Facade industry, he has managed to assist in designing concrete facade at not only on private buildings that include but not limited to bungalows and condominiums, but also commercial buildings like arches on KL-Selangor Boundary and also decorative item of commercial factories.

On the other hand, Mr. Oscar is also a consultant on construction contract dispute which assist contractors on claiming issues.



Mr. James Lim

Media Committee

James Lim completed his degree in Civil Engineering from the University of Auckland in 1996. He started his career as a structural engineer with a consultancy firm and subsequently developed his interests in concrete repair and waterproofing. He then went on to work for companies such as Hilti, MC Bauchemie and Fosroc in product sales and specification work. In 2002, he obtained his Executive MBA from the University of Bath UK. In 2005, he ventured out from the corporate world to start his own specialist contracting company specializing in concrete repair and waterproofing servicing the construction industry in Malaysia.

He specializes in the repair of cracks in concrete elements by method of injection. He has helped many contractors resolve their troubled leaks with specialized application. In addition, he also has vast interests in basement and roof slab waterproofing system especially in the spray polyurea lining system. His recent experiences include KVMRT Line 1 and KVMRT Line 2 underground station waterproofing work.



Ms. Melissa Lim

Media Committee / Selangor Rep

Melissa Lim had accumulated more than 15 years of experience in marketing and project operation, particularly in the construction industry.

Some of her greater achievements including to be certified as one of the first females as 'ACI Concrete Flatwork Technician' in Malaysia by ACI USA.

She leads few teams of engineers and supervisors to manage few projects on hand for ZACKLIM company to construct flat floors for several prestigious projects in Malaysia where she focuses mainly on IKEA & IKANO projects where she is committed to deliver her best effort to meet client's requirement and achieve the project target deadlines by exerting her strengths on planning and management skills.



Mr. Eric Soong

Head of Event Committee

Eric obtained his Bachelor and Masters in Engineering in Australia in the year 2006 and 2012. He spent some 6 years in environmental engineering consulting in Australia where he gained significant experience in playing leading technical roles in many major complex engineering and environmental projects. On returning to Malaysia in 2013, Eric took on a leading role in managing and leading the technical advisory support to the Sales and Marketing Team in the decorative concrete industry. Over the last 5 years, Eric has worked proactively with the manufacturing arm to explore environmentally friendly decorative concrete paving products.



Ms. Serina Ho

Advisor of Event Committee

Ms Serina Ho has a long experience in the cement and concrete industry. Serina holds a Chemistry degree from University of Malaya and MBA Degree from University of Hull, UK. She is a member of Malaysian Institute of Chemistry and the President of American Concrete Institute, Malaysia Chapter. Serina has a vast experience in both cement and concrete industry. She has held position as Chemist in cement plant, in charge of quality and R&D of cement products. She has also held position as Product Manager in ready-mixed company, responsible for developing and marketing of concrete products. Currently she is the Manager, Technical and Product Development in Hume Cement. Not one to shy from public speaking, she is an excellent communicator and has more than 20 years of experience in public speaking and training.



Mr. Lee Yean Fu

Event Committee / Johor Rep

Mr. Lee Yean Fu started his career since 1995 when he joined Sika Kimia Sdn Bhs as Johor Branch manager after he obtained his first degree in Business Admin. In August 1997 during Asia Financial crisis beat, he resigned from Sika and started his own company, UFT Structure Re-Engineering Sdn Bhd, dealing in application works in concrete repairs, protective coating and waterproofing until todote. In January 2000, he formed another entity, Sinct-lab Sdn Bhd, handling Site Investigation and Concrete Test (SINCT) to enhance services of UFT. As time passes, Sinct-lab has later encompassed C&S consultancy services including design & submission of building structures with few more engineers joining the company. Todote he is running a concrete repair team consists of Professional engineer and senior design engineers which can perform speedy concrete repair and strengthening works begin from site investigation to handling over of repaired structures.

Notices

Membership Subscription 2021

Gentle reminder that 2021 subscription is due.

Kindly note that payment can be made as follows:

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Members who have paid their subscription will receive their digital membership certificate.

See sample below.



Up Coming Events

Free Webinar - The Tech-Talk Hour



DEFECTS, FAULTS AND FAILURES IN CONCRETE STRUCTURES

FREE Webinar


Live on F B

27 May 2021 8:30pm - 9:30pm
Thursday

THIS TALK WILL COVER:

- Problems and challenges of our built environment
- Definition of defects, faults and failures
- Cause-effect relationship
- Common deterioration mechanisms in tropical climates
- Diagnosing causes of deterioration

Speaker



Ir. PARNAM SINGH
Professional Civil Engineer

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Free Webinar - An Evening with ACI-MY

Speaker: Mr. James Lim / Mr. Smith Yong

Topic: Waterproofing Series EP3

Date: May 2021 (Date to be announced later)

Time: 8:30pm - 9:00pm



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Preceding Events



FREE WEBINAR **LIVE ON FB**

aci
American Concrete Institute
Malaysia Chapter

INTRODUCTION TO RESIN FLOORING

This talk will cover:

- 1- Types of resin flooring
- 2- Purpose of resin flooring
- 3- Application of resin flooring
- 4- Common problems of resin

15 APR | **THURSDAY**
8:30PM - 9:30PM GMT +8

Speaker :
FRANKIE CHUA
CHEMIST

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- AN EVENING WITH -
ACI-MALAYSIA

Waterproofing Series: Episode 2 FLAT ROOF WATERPROOFING

Live on FB **FREE**

Speaker: **SMITH YONG**

This talk will cover:

- 1- Typical problems/ issues
- 2- Rewaterproofing solution

30th April 2021
Friday
9PM (GMT+8)

Speaker: **JAMES LIM**

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Article

Pigmented Concrete Facade Finishing (Part 1)

By: Oscar R.H Teng, Tony Teng

Façade, have you ever wondered how do you read this word? Have you come across this word around while being in the construction industry? There have been multiple pronunciations in the construction industry especially in Malaysia. According to the Cambridge Dictionary, the proper pronunciation is /fə'sɑ:d/ (Cambridge University Press, 2020), which in other words, it is similar to “Far – Sud”. According to the above dictionary, façade is defined as; the front of a building, especially a large or attractive building (Cambridge University Press, 2020) where in lay-man term, the make-up of the building.

Among the range of façade materials, concrete façade has its own unique character. It is believed that concrete façade serves to bridge between the design of ancient stone façade of castle like buildings to modernized unique curvy designs. This is due to concrete being ‘malleable’ which enable the shape of the concrete to be limitless as long as the mould can be fabricated.



With the advancement of concrete technology and knowledge, concrete façade has developed from painted concrete to stained concrete and further to pigmented concrete as the replacement of conventionally dull color concrete. To further explain pigmented concrete, it is the mixture of color pigments dispersing in the medium of cement mortar (binder) in order to create colored concrete when cured.

One of the recent building in Malaysia was constructed with it's entire building covered with pigmented concrete as their façade curtain wall with combinations of aluminium-frame and glass is The Chow Kit Hotel located in Kuala Lumpur, Malaysia.

Unsurprisingly, such distinguish design has won itself multiple press featurings including but not limited to; Monocle (UK); 'Key Opening' and The New York Time Online; '52 Place To Go in 2020' (Ormond Group, 2019).

The beauty of pigmented façade is the huge contrast of color depending on the time, light, and weather effect on the concrete. With all theses features, this is one of the reason why The Chow Kit was featured. At noon, the façade is more towards brown in color while evening, the color will turn slightly reddish. Even better, as night falls, the building will appear more amazing when the color appear to be brownish-red especially when the spot lights illuminated the façade.



(Left)The Chow Kit by Ormond Group, evening sun (Ormond Group, 2019)

(Right)Side view of The Chow Kit by Ormond Group, night view(Ormond Group, 2019)

Apart from Malaysia, pigmented concrete is being used all over the world as façade. Pigmented concrete can be shaped into different shapes just like normal concrete. Below are some buildings from all over the world which are featured in both 'Archdaily' website that present architecturally interesting building internationally and 'Concrete Construction' website where usage of concrete is often discussed.

The Casa das Historias Paula Rego (ArchDaily, 2020)

Built in year 2008, designed by architect Eduardo Souto de Moura. This building have two iconic red pigmented concrete pyramid-shape towers. Being a museum, having a timeless design using pigmented concrete has always been a choice by many architects.



L23 House (ArchDaily, 2020)

Built in 2011, designed by Pitagoras Group. This is a private house located on a slope of a higher point of Guimaraes city, Portugal. In order to outstand the house itself on a slope full of greens, black pigmented concrete façade was selected as a contrast on the hill.

Textilmacher (ArchDaily, 2020)

Built in 2013, designed by Tillicharchitektur. Textilmacher is an office building/showroom located in Munich, Germany. The building is designed for a company that does textile print and embroidery. Hence, the iconic geometry folded design is combined with grey pigmented concrete façade to represent the character of the textile company. Nevertheless, depending on the season, time, light shining on the building and the weather, the pigmented façade will change it character continuously.



Pigmented concrete façade is not limited to rectangular panels but can be designed to any forms. With different texture/shapes of pigmented concrete, we can achieve various kinds of finishing effects. We shall discuss about the finishing textures available for pigmented concrete in the next article.

Technical Reports

STRENGTHENING OF RC BEAMS USING PRESTRESSED FRPs

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INTRODUCTION

The service life of concrete structures mainly depends upon both the satisfactory design and use of appropriate construction materials. Any flaw in these factors may result in the early degradation and deterioration of the structure. The replacement of such structures is not always possible due to the high operational expenditure and their usage limitations. The only way to retain the structure in a safe working mode is to strengthen or renovate the structures [1]. A number of attempts have been undertaken by the researchers to identify the most suitable materials and appropriate techniques to strengthen the deficient structures, which resulted in an abrupt increase in the use of the prestressing technique for this purpose. Nowadays, strengthening has widely been done using prestressed materials, such as steel tendon and fiber reinforced polymers [2].

Prestressing the FRPs allows the material to efficiently utilize its tensile capacity which enhances its ultimate and serviceability limit capabilities [3]. The popular types of FRP identified by researchers include aramid fiber reinforced polymers (AFRP), carbon fiber reinforced polymers (CFRP) and glass fiber reinforced polymers (GFRP) in the form of rods, strips, plates and laminates. The aim of this study is to find out that which material has received considerable attention from researchers using different prestressing techniques. The use of prestressed CFRP under near surface mounted, externally bonded reinforcement and externally posttensioned techniques is presented and the corresponding advantages and disadvantages are highlighted.

PRESTRESSED STRENGTHENING MATERIALS

The steel and FRPs have been used in the strengthening of deteriorated structures (Fig. 1). Steel is the traditional and commonly used material. Though all the materials are adequate for strengthening, however, the passage of time and the advancement in the subject have led researchers to explore strengthening materials that have the ability to provide maximum benefits in terms of strength, serviceability and construction, as well as maintenance cost. In steel, the ductility, good strength to weight ratio and low fabrication and erection costs makes it a suitable material for strengthening purposes in both normal and prestressed conditions. Strengthening by prestressed steel tendons is a popular method due to its availability, uniform

material properties, easy of working, high ductility and high strength. Strengthening reinforced concrete beams with steel tendons is an efficient technique.

However, the disadvantages exhibited by prestressed steel tendons motivated the researchers to identify a better replacement for steel for the purpose of strengthening. Importantly, the upgrading of concrete structures is not easy in most cases as structures pose a difficult and different set of problems.

Prestressed FRPs compensate the weaknesses displayed by prestressed steel and have been introduced in recent decades as a more suitable strengthening material than steel. Prestressed FRPs have recently been used in concrete structural members as external or internal reinforcement instead of conventional steel tendons. FRPs have good potential of use due to their desirable properties in prestressed conditions. These properties include high performance, high strength-to-weight ratio, high stiffness to weight ratio, high energy absorption, corrosion resistance and high fatigue resistance. When used for strengthening, prestressed FRPs can control the aging of construction materials and can sustain the impacts of vehicles and fire far better than prestressed steel. Seismic upgrading and changes in the use of the structure are also more easily accommodated through the use of these polymers. Among the available FRPs, prestressed CFRP accounts for 95% usage in applications adopted for the strengthening of structures. Prestressed CFRPs are suitable where the strength, stiffness, lower weight and fatigue are critical issues. Moreover, CFRPs are useful in applications that require high temperature resistance, chemical attack resistance and damping resistance. At this stage, it is essential to validate the suitability of prestressed CFRP usage under different prestressing techniques.

FRP materials have great advantages for using in prestressing and post-tensioning strengthening applications. Beside their economic benefits, prestressed FRP systems provide the following benefits and advantages: i) it can improve the serviceability of the beam, ii) reduce the dead load deflections, iii) it can reduce the crack widths and delay start of cracking, iv) it can relieve the strains in the internal steel reinforcement, v) it can increase the yielding of internal steel reinforcement at a higher proportion of the ultimate load, vi) it can provide more efficient use of the concrete and the FRP materials.

PRESTRESSED STRENGTHENING TECHNIQUES

All of these materials (steel and FRPs) have been investigated under a variety of strengthening techniques that include near surface mounted (NSM), externally bonded reinforcement (EBR) and external post-tensioning (EPT) as can be seen in figure 1 by using anchorage and non-anchorage systems [4]. Strengthening using prestressed NSM CFRP technique is growing widely and offers an alternative to the EBR and EPT prestressing systems. The schematic diagram of NSM prestressed FRP reinforcement and its real-life application are shown in Figs. 2 & 3.

However, the real-life application of EBR and EPT with prestressed FRP reinforcement is shown in Figs. 4 & 5, respectively.

The following are some of the advantages of NSM over EBR and EPT:

- Excellent for strengthening in the negative moment regions, where EBR would be subjected to mechanical and environmental damage.

- Feasibility of anchoring into members adjacent to the one to be strengthened.
- Less likely to debond near ultimate capacity.
- Protection of the embedded FRP in the grooves from external damage, such as vehicle impact, better fire performance, resistance to moisture and avoids freeze-thaw problems.
- The choice of FRP material with higher strength and modulus of elasticity such as CFRP instead of GFRP and AFRP, would allow the use of smaller FRP and groove cross sectional areas; hence, there is less risk of interfering with the internal reinforcement.
- In terms of structural behaviour, it's most relevant mechanical properties are the tensile and shear strengths; therefore, the grooves can be properly filled with epoxy adhesive or cement mortar.

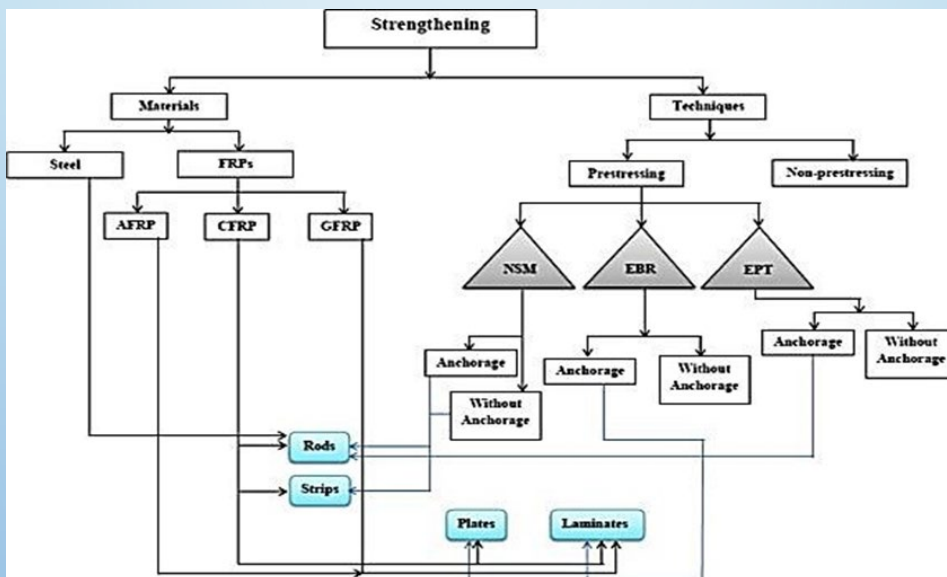


Fig. 1. Chart of Strengthening Process

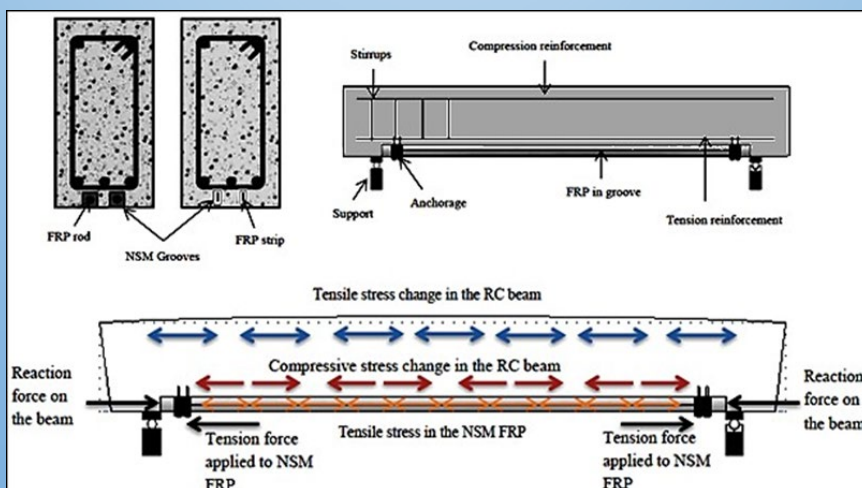


Fig. 2. Schematic diagram of NSM prestressed FRP reinforcement

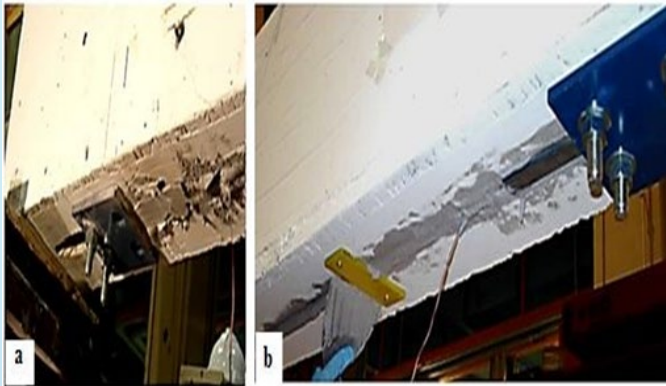


Fig. 3. The application of NSM method using prestressed FRP bar for strengthening RC beam [5]



Fig. 4. Real life picture of externally prestressed CFRP bonded strengthened building, Ebikon, Switzerland (CH) [6]



Fig. 5. Real life strengthened bridge (EPT Technique)

CONCLUSIONS

The general conclusion made from this study are summarized below:

Compared to FRPs, the prestressed steel has comparatively heavier weight and low resistance against adverse environmental conditions that can produce a larger reduction in its mechanical properties.

- Compared to prestressed steel, prestressed FRPs exhibited good potential and desirable structural properties including high flexural strength, enhance the ultimate load carrying capacity, reduce the deflections, high strength to weight ratio, high stiffness to weight ratio, high energy absorptions, corrosion resistance and high fatigue resistance. Moreover, the debonding resistance of prestressed FRP is higher than for prestressed steel.
- Among the types of FRPs, CFRPs are more likely to contain all the advantages of other FRPs, and, in addition, it was observed that prestressed CFRPs increase the flexural strength and ductility of the structure.
- The near surface mounted (NSM) technique provides a shield to the prestressed strengthening material against the environment, and, at the same time, provides an optimum and quick experimental setup. In addition, it may improve the cracking, yielding and ultimate loads more effectively.

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Case Study

CONTRIBUTED BY: MAPEI (M) SDN BHD

Kuantan Port, Pahang



Kuantan Port-1

About Kuantan Port

Kuantan Port is a multipurpose port in the East Coast Region of Peninsular Malaysia, situated about 25 km to the north of Kuantan city and facing South China Sea. Previously run by Kuantan Port Authority, it has been privatised since 1998 and is currently operated by Kuantan Port Consortium Sdn Bhd.

With the development of Malaysia-China Kuantan Industrial Park (MCKIP) and the ECRL, Kuantan Port is becoming a world class port and various expansion is underway. Part of the port expansion project (New Deep Water Terminal), there are also refurbishments projects of existing wharf to double its capacity to 52 million freight weight tonnes (FWT) and enable larger ships to berth.



The Project Needs

The wharf has been suffered with reinforcement bars corrosion that had lead to concrete spalled due to high chloride environment. Kuantan Port Consortium Sdn Bhd decided to refurbish the port as Kuantan Port is set to become a crucial multi-purpose port in the region. The project was awarded to 3R Systems Sdn Bhd.

The Proposed Solutions & Why MAPEI was selected

MAPEI was able to propose a total solution from reinforcement bars treatment until protective coatings to the awarded contractor.

The MAPEI Solution, material quantities & project dimensions

MAPEI Product	Function	Applied on
a) Epojet LV	Crack filling	Underwharf
b) Adesilex PG2 TG	Crack sealing	Underwharf
g) Mapecoat ZR MY	Protective coating	Reinforcement bars
d) Planitop G40 SP	Patch repair	Underwharf
e) Mapefill MC 06	Formwork repair	Underwharf
f) Antipluviol S-MY	Protective coating	Underwharf
g) Colorite Performances S-MY	Protective coating	Underwharf

The works were carried out over a period from December, 2017 to December, 2018.

Picture, the works of concrete repair...



Remove all contaminated defective concrete, till sound concrete is reached.



Clean all exposed reinforcement rust.



Substrate which is ready for application

Picture, the works of concrete repair...



Preparing formwork to under wharf for concrete repair.



*Repairing the concrete with **Mapefill MC 06** after treated the reinforcement bars with **Mapecoat ZR MY***

Picture, the works of concrete repair...



After application of **Mapefill MC 06**

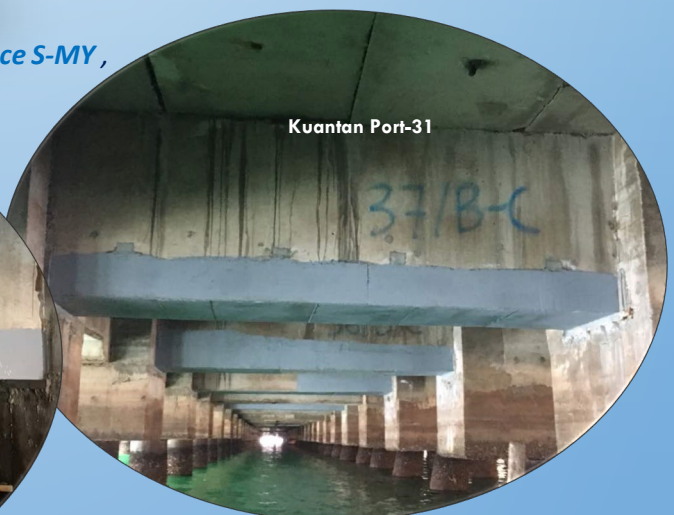


Continue with the application of **Planitop G40 SP**



Splash water on the surface for the first 24 hours of curing to avoid surface cracks from plastic shrinkage.

Protect the concrete with **Colorite Performance S-MY**, with **Antipluviol S-MY** as the priming coat.



Picture, works completed...



Completed works of refurbishment of Kuantan Port



Overview of Kuantan Port



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We believe a
long lasting business
relationship is built
on friendship.

About Us

American Concrete Institute-Malaysia Chapter (ACI-Malaysia) is a non-profit technical and educational society representing ACI Global in Malaysia, which is one of the world's leading authority in concrete technology.

Our membership is not only limited to engineers, in fact it includes educators, architects, consultants, corporate bodies, contractors, suppliers and experts in cement and concrete related fields.

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We look forward to your kind support and, more importantly, to your participation and registration as a member of ACI-Malaysia Chapter. It is our firm belief your involvement and together with your commitments will go a long way in our quest to uphold all our objectives to mutually benefits for all members.

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Membership Application Form

Type of Membership (please tick "☐" one option only)

	<u>Joining Fees (Total)(RM)</u>	<u>(Entrance Fee + Subscription Fee per annum)</u>
<input type="checkbox"/> Organizational Member: A Firm, Corporation, Society, Government Agency or other organizations.	RM800.00	(RM500.00 + RM300.00)
<input type="checkbox"/> Associate Member: An individual who is not a member of ACI International but American Concrete Institute – Malaysia Chapter only.	RM200.00	(RM100.00 + RM100.00)
<input type="checkbox"/> Student Member:	RM30.00	(RM30.00 + RM0.00)

To be admitted as a Chapter Member^(*), return this form together with Crossed-cheque (any outstation cheque to include Bank Commission)/ Online Bank Transfer/ Cash Deposit made payable to:

Account Holder Name: **American Concrete Institute – Malaysia Chapter**
 Bank: **Hong Leong Bank Berhad (HLB)**
 Account Number: **291.0002.0936**

Once payment has been made, it is important to send Remittance Slip/ Deposit Advice/ Bank Transfer Receipt to our Administrative Office for confirmation, via these channels:

WhatsApp: +60 (14) 2207.138 (ACI.my Administrative-2); or
 eMail: admin@acimalaysia.org

(*) Benefits provided by ACI International for Chapter Members:

1. Digital subscription to Concrete International magazine;
2. Access to the ACI Membership Directory; and
3. 3-Tokens to ACI University Courses;
4. Printable ACI Membership Certificate

Important Notes:

- ❖ Benefits will be accessible via Temporary Password sent to your email account either in the month of June or December, depend on time slot of Chapter Member List update to ACI International;
- ❖ All benefits are subject to change without prior notice.

Personal Particulars:

Are you a Member of American Concrete Institute International (ACI International)?

- No.
 Yes. (Please provide your ACI Int'l Membership Number: Since (Year):)

Name: _____ (First) _____ (Last)

Salutation / Title: _____ (Mr./ Ms./ Mdm./ Ir./ Ar./ Dr./ Prof./) Other: _____

NRIC/ Passport No: _____ Nationality: _____

Mobile Number: +60 (1) - _____ Email: _____

Company / Organization: _____ Designation: _____

Postal Address: _____

Postal code: _____ State: _____

Tel.: _____ Fax: _____ Email: _____

I am introduced to ACI-Malaysia Chapter by: _____

.....
 Applicant Signature

.....
 Date

For Office Use Only

Membership No: [][] - [][][][][] Receipt No.: _____ Date: _____

Verified by: _____ (Name: _____) Date: _____

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