Professorial Lecture Prof. Dr. Hjh. Hamidah Mohd Saman

The Future & Wonders of Floating & Living Concretes

Program

Professorial Lecture

Dewan Seri Impian, Hotel UiTM Shah Alam

23 August 2022, Jam 2.15 p.m

Nama Prof. Dr. Hjh. Hamidah Mohd Saman

Tajuk The Future & Wonders of Floating & Living Concretes

Jangka masa : 1 jam 23 minit

Transkrip:

3:43 : Announcing the arrival of the honoured speaker, Professor Dr. Hajiah Hamidah Muhammad Samman, Dean of Industry, Community and Alumni Network, College of Engineering, UITM, accompanied by honorary deans to enter the hall. Ladies and gentlemen, please stand up.

8:24 : Thank you. Please be seated.

8:41 : Hamidah, besar nanti awak nak jadi apa? Entahlah awak. Tapikan, saya rasa saya nak jadi professor.

8:56 : Yelah tu? Boleh ke? Eh awak ni, selalu sangat orang cakap macam ni dekat saya. Kecil hati saya tau. Beso kecil beso kecil saya tengok awak nil ah Husna.

9:12 : Tengoklah satu hari nanti, saya akan buktikan dekat awak yang saya akan jadi professor terulung. Masa tu baru buntang biji mata awak Husna.

9:21 : Hamidah, Hamidah. Semoga awak Berjaya la erk. Yelah. Okaylah, saya nak balik. Bye. Bye.

10:40 : Bismillahirahmani Rahim. Yang Berbahagia Professor Dr. Hajah Hamidah Mohd Saman, Dean of Industry, Community and Alumni Network, College of Engineering, UITM. Yang Berbahagia Prof. Savior Engineer Dr. Haji Suhaimi Abdul Talib, Asisstant Viles Cancelor College of Engineering, UITM. Yang Berbahagia Profesor Ts. Dr. Wardah Tahir, Director of Curriculum Affairs UITM. Yang berbahagia Major General Datuk Pahlawan Ingenier Haji Capiti Haji Rizwan, Director General Markas Angkatan Tentera Malaysia, Bahagian Perkhidmatan Kejuruteraan Pertahanan.

11:28 : Yang berbahagia Datuk Ingenier Rozlan Ahmad Zainuddin, Presiden Civil Engineering Alumni Club. Datuk Teknologi Dr. Ahmad Rozlan Mohamad Rizwan, Orang Kaya Panglima Bukit Ganteng Sri Amar Di Raja, Ahli Dewan Negara Perak Darul Rizwan, Deans, Deputy Deans, Directors of UITM, Industri Partners, Representative from American Concrete Institute Malaysia Chapter Concrete Society of Malaysia Alumni.

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12:04 : Ladies and gentlemen, Assalamualaikum warahmatullahi wabarakatuh and a very good day everyone. Alhamdulillah, with all his blessings, we are now gathering in this event for the professorial lecture session by Professor Dr. Haji Hamidah Muhammad Saman, Dean of Industry. On behalf of the School of Civil Engineering, UITM and the committee members, I would like to take this chance to thank you all for your participation in this event.

12:45 : Ladies and gentlemen, to seek blessing from the Amal team, we would like to invite Associate Professor Dr. Muhammad Fadhil Arshad to lead the prayer recitation. Please welcome.

13:05 : (Bacaan Doa)

16:00 : Thank you, Associate Professor Dr. Muhammad Fadhil Arshad to lead the prayer recitation just now. May today's event will go on smoothly, inshallah. Ladies and gentlemen, School of Civil Engineering UITM is delightful with the opportunity given in organizing our today's event of professorial lecture.

16:21 : We would like to welcome everyone and also audience who are watching via the official UITM YouTube channel and College of Engineering FB Live. Thank you and stay tuned to the end of this event. Ladies and gentlemen, now we would like to invite Yang Berbahagia, Professor Surveyor Engineer Dr. Haji Suhaimi Abdul Talib, Assistant Vice Chancellor, College of Engineering to deliver his welcoming speech, thus introducing our speaker for today. Please welcome, Prof.

17:07 : Bismillahirrahmanirrahim. Assalamualaikum warahmatullahi wabarakatuh and a very good afternoon. Thank you, Dr. Nurbaya Siddiq, our emcee.

17:18 : Ladies and gentlemen, allow me to welcome our dignitaries. First and foremost, Yang Berbahagia, Prof. Dr. Hajah Hamidah Mohamad Saman. It is certainly my privilege to be here to introduce you.

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17:34 : Yang Berbahagia, Professor Ts. Dr. Wardah Tahir, Director of Curriculum Affairs of UITM. Also representing the Deputy Vice Chancellor for Academic and International. Yang Berbahagia, Major General Datuk Pahlawan, Engineer Haji Capiti Haji Ridwan, Director General Markas Angkatan Tentera Malaysia, Bahagian Perkhidmatan Kitraan Pertahanan. Thank you for being here, sir.

18:05 : Datuk Engineer Rozlan Ahmad Zainuddin, President Civil Engineering Alumni Club, who has been very supportive of us. Datuk Ts. Dr. Ahmad Rozlan Mohamad Ridwan, Orang Kaya Panglima Bukit Ganteng Sri Ahmadiraja, Ahli Dewan Negara Perak, Deans, Deputy Deans, Directors of UITM, Industry Partners, Representatives from American Concrete Institute, Malaysian Chapter, Concrete Society of Malaysia, Alumni, Ladies and Gentlemen.

18:43 : Allow me to introduce the speaker for today's professorial lecture. Professor Dr. Hamidah Mohamad Saman was born on the 9th of October in 1966, Muar, Johor. She completed her primary education at Sultan Abu Bakar Primary Girls' School and secondary education at Sultan Abu Bakar Secondary Girls' School, Muar, Johor.

19:07 : She obtained her Bachelor of Science in Civil Engineering from University of Miami, Florida, USA in 1985. She worked in Getah Indus Sdn Bhd in Tangkak, Johor in 1985 to 1982. She joined Sirim Berhad as a researcher in 1992 and further studied and obtained her PhD in 1999 with a thesis titled Durability of Steel and Fiber Reinforced Plastic in Concrete Containing Silica Fume.

19:42 : She joined UITM in the year 2000 as a lecturer. Among positions held by her during her tenure at UITM included Coordinator of Research and Consultancy, Coordinator of Post-Credit Programs for seven years, Director of Institute of Infrastructure, Engineering and Sustainable Management, ISM, for a year, Head of Quality Management Unit for seven years, Deputy Dean of Research and Industry Linkage for three years, Head of School of Civil Engineering, and currently she is the Dean of Industry Community Alumni Networking for the College of Engineering in UITM. Professor Dr. Hamidah has supervised almost 30 post-graduate research problems and more than 20 have graduated.

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20:36 : Professor Hamidah is a well-decorated researcher receiving many accolades and awards for her research products. I will now name a few of the many acknowledgements received for her research excellence. Gold and Special Award at the International Trade, Fair Ideas Invention New Products Aena, Germany in 2006 and 2008 for her floating dwelling innovation.

21:06 : Silver Award for Coconut Particle Board Product at the Seoul International Invention Fair
(SIIF), in 2007. Best Commercial Value Award at the Melaka International Intellectual Exposition 2016. In addition to her innovative products, she is also an active consultant that has received numerous research grants from private agencies that needed her professional services.

21:34 : The highest amount of contract research, the highest amount of contract research grant received by her from industry is from Jacqueline floor specialists amounting to a quarter of a million. Followed by Concrete Society of Malaysia, Academy of Concrete Technology, Nik Jai Associates in Sdn Bhd, Temple Light Installations in Sdn Bhd, YM Microworks, Sdn Bhd, Shah Cement Industry Limited, CEA Engineering Consultancy, Soulfly Engineering and Security, Sdn Bhd, Netus Lab, Sdn Bhd, and Serata Sinar Enterprise amounting to more than 1.2 million ringgit. Besides project worth millions of ringgit, she is also engaged in outreach program with the Malaysian Investment Development Authority (MIDA), valued at approximately 1 million.

22:29 : And Ipoh City Council for the formulation of blueprint towards low carbon city, again with an amount of a quarter million ringgit. Apart from these grants she obtained from industries and private agencies, she has been a principal researcher for many research projects that have received grants from government agencies such as eScience from Ministry of Science, Technology and Innovation (MOSTI), Exploratory Research Grant Scheme (ERGS), Fundamental Research Grant Scheme, (FRGS), under the Ministry of Higher Education. She has received research grants and consultancy amounting to more than 5 million ringgit.

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23:12 : Ladies and gentlemen, due to her outstanding accomplishment and contribution to research, she has been conferred for two consecutive years Innovation Awards 2001 and 2002 from Bank Islam Malaysia Berhad, the most active research panel assessor award and an editor for my side index journal during the research summit day 2017. She was also awarded a special award from American Concrete Institute, the Malaysian chapter in appreciation for her contribution to the construction industry. She is also a three-time recipient of the Excellent Service Award, won in 2002, 2013 and 2020.

24:00 : She was awarded a Tokoh Kualiti Berterusan or Continuous Quality Icon at the faculty level in 2019. Her designation portrays her active involvement in professional bodies as a secretary of Concrete Society Malaysia for 10 sessions for 20 years since the year 2000. Committee treasurer, secretary since 2007, now holds a position as a director of American Concrete Institute Malaysian chapter and also a member of Institute of Engineering and Technology (IETUK).

24:42 : Based on her expertise, she has been appointed as a chief editor for scientific research journal UITM, a member of the editorial board for Malaysian Construction Research Journal, KRIM CIDB, the Institution of Engineers Malaysia IEM Journal, Journal of Engineering Science and Technology, JASTEC, International Sustainable Construction Journal co-published by UTHM Concrete Society of Malaysia and now she is an editor for Journal of Sustainable Civil Engineering and Technology. Ladies and gentlemen, you see that Prof. Hamidah is a well-rounded person. I am certainly honored and privileged to introduce you to her.

25:31 : But I still feel that after reading such a lengthy introduction, justice is not done to her. If you would indulge me, allow me to share what others thought of her as well. So, would the technical team play a short montage of Prof. Hamidah?

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26:06 : (Montage)

31:49 : So ladies and gentlemen, that is our professor. And this is the time now I would like to hand over the session to Prof. Hamidah. Ladies and gentlemen, please allow me to give you the lady, the researcher, the professor, Prof. Dr. Hamidah Muhammad Samad, who will be talking to us on the future and wonders of floating and living concrete.

32:16 : Thank you, Prof. Suhaimi. Assalamualaikum and salam sejahtera to Professor, Surveyor, Engineer, Dr. Suhaimi Abdul Talib, Assistant Vice-Chancellor, College of Engineering, Prof. Technologist, Dr. Wardah Tahir, Director of Curriculum Affairs Unit, UITM, Major General, Datuk Parlawan, Engineer, Haji Shapiti, Ben Haji Rizwan, Director General, Markas Angkantar Tentera Malaysia, Perkhidmatan Kejuteraan Pertahanan, Datuk IR Ruslan Ahmad Zainuddin, President, Civil Engineering Alumni Club, Datuk Technologist, Dr. Ahmad Ruslan Muhammad Rizwan, Orang Kaya Panglima Bukit Ganteng, Seri Amar Diraja Ahli Dewan Negeri Perak, Prof. Dr. Zakir Ahmad, Dean of Research and Innovation, College of Engineering, Prof. Engineer, Dr. Muhammad Azmi Ayub, Dean of Academic and International, my industry partners, deans, deputy deans, directors of UITM, representatives from American Concrete Institute Malaysia Chapter, Concrete Society of Malaysia, alumni, my friends from Perwani, who always support me, ladies and gentlemen.

34:38 : Concrete is a wonder of man-made concrete. From rocks, hills, mountains, it is transformed to decent or luxurious places for human beings, animals and creatures for their shelter. Concrete can be cast into desired shapes and sizes to produce beautiful structures with high architectural values, either it is designed using traditional or modern concepts.

35:13 : The oldest concrete buildings in Malaysia are durable, still standing, while modern architectural concrete structures have become landmarks of the country. Concrete has evolved since its establishment in 1756 by John Semitone, and since then, concrete has been evolving towards blended cement, ultra-high-performance concrete, geopolymer, towards self-healing concrete, smart, nano, and translucent concrete in the 21st century. However, the evolution of concrete comes with challenges, and the challenges can be divided into two categories.

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36:07 : First, deterioration, and second, environment and sustainability issues. Concrete deteriorates to external and internal effects that induce cracks. The cracks allow penetration of liquid that promote deterioration, such as corrosion of steel reinforcement, carbonation, alkali aggregate reaction, that all will lead to disintegration and spalling.

36:38 : Meanwhile, huge consumption of natural aggregate, natural resource depletion, and adverse impact to environment become major issues as far as concrete production is concerned. Therefore, concrete needs to be transformed into sustainable technology. Supplementary cementitious materials, or SCM, such as fly ash, rice husk ash, waste paper sludge ash, or WPSE, and ground granulated blast furnace slag, or GGBS, were introduced by researchers in the 1980s.

37:24 : When one SCM is used to replace Portland cement, or OPC, it is called binary blended. If two types of SCM are included, it is called ternary blended. To be SCM, the total content of silica oxide, calcium oxide, and aluminum oxide must be higher than 70%, as according to ASTM C618, SCM is also called mineral admixtures.

38:01 : The advantages of using blended cement concrete are in three folds. First, it reduces cement consumption. Secondly, it contributes to early or later strength.

38:17 : And thirdly, it improves durability because of the pozzolanic reactions due to secondary hydration that form additional calcium silicate hydrated product of cement hydration that densify the microstructure of the matrix binder, lead to low permeability. For today's presentation, two parts of concrete wonders are deliberated. First part is on lightweight concrete, and second part is bioconcrete.

38:55 : Lightweight concrete is defined as concrete that has density below than 2,000 kg per meter cube. Normal concrete density is 2,400 kg per meter cube. Three types of lightweight concrete can be achieved by three methods.

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39:16 : First, by using lightweight aggregate. Second, by introducing expanding agent. And third, by eliminating fine aggregates, or known as no fine concrete.

39:31 : However, only one type of lightweight concrete that I have been working on, which is the one using expanding agent, that is called foam concrete, and will be presented today. The mix to mix proportion from concrete with various densities and in-house spreadsheet was developed and tested its accuracy in terms of the density of concrete produced. The uniqueness of this spreadsheet is its mix proportion of an arbitrarily chosen density, the sand-cement ratio, and water-cement ratio can be calculated.

40:18 : The spreadsheet can also be used to mix proportion for modified foam concrete and prove them accurate with respect to its fresh mortar density before and after adding foaming agent. I would like to show you how the spreadsheet is used. For example, with density 1,600 kg per meter cube, sand-cement we set 1, and water-cement ratio 0.6. For this spreadsheet, the material used are cement and water, and we can add any other SCM, such as WPSE, glass fiber, and also recycle concrete aggregate, provided that we know the values for specific gravity for each ingredient.

41:14 : By using the specific gravity values, the weight of the ingredients can be converted into liters. And this liter for all the ingredients will be totaled up. Then this liter will be converted to 1,000 liters, and this spreadsheet, because of the formula already set, it will recalculate automatically for each ingredient's use.

41:46 : So give the mortar before adding foam. For targeting density, by using this spreadsheet, so the amount of foam and the amount of mortar can be calculated. So if we intend to produce one meter cube, or maybe more than that, for example, two meter cube, then it will automatically generate the amount of foam and mortar and also the ingredients for all to make a foam concrete.

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42:28 : The quantity of foam agent to be introduced will be set by timer of the machine. The flow rate of the foam that discharged from the machine is initially determined. The timer will be set to control how much foam is needed.

42:50 : We can try another density. For example, we can try less than 1,000. For example, 900 kg per meter cube to make the foam concrete floating.

43:03 : Then we can change water-cement ratio to 0.5. Water-cement 0.5. And we can see the values for the color will change. So it is noted that when we target lower density, the amount of foam will be higher. The foam is generated by a machine that is locally fabricated and combined with a compressor, as in the picture, to compress the liquid foaming agent into foam and introduce to mortar that made of cement, sand, and water.

43:54 : After mixing, the workability of foam concrete is tested using flow-spread test. A comprehensive study covering parameters like different sand-cement ratio, different densities, and two curing regime conditions was conducted under the grant awarded by the Ministry of Science, Technology, and Innovation, MOSTI. The study continued with other parameters like different types of foaming agent and introducing by-product materials to replace cement and use of recycled aggregate to optimize use of cement.

44:36 : And calls were also conducted. The findings are a higher compressive strength was attained by the water-cured specimen indicated by the dotted line than the air-cured specimen. The higher compressive strength is obtained if high cement content is used.

45:01 : The foam concrete with density of 1,000 kg per meter cubed can attain compressive strength above 30 MPa if very high cement content is used. Replacing cement by 20% WPSA is not significantly different from those of the corresponding concrete containing only Portland cement at 180 days of age. The inclusion of fine recycled concrete aggregate or FRCA up to 30% boosts the compressive strength than that of controlled specimens and able to reach about 10 MPa at 180 days of age.

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45:51 : Inclusion of both 20% WPSA and 30% FRCA producing an equivalent compressive strength as those of plain foam concrete at 180 days. Collaboration with industries has moved forward the laboratory scale to mass production of foam concrete in producing lightweight blocks and a stay-in-place or SIP hollow formwork which taken up by this Jaya Concrete Products and Solid Housing Solutions Systems respectively. This SIP formwork is an unremovable formwork and it will be the internal and external surface of the walls.

46:43 : The hollow space in between will be filled up by foam concrete and other applications of foam concrete include embankment and foundation filling. Another concrete wonder is about making concrete alive at the same time prolong its service life. Concrete is alive if living things are included making it able to self-heal when there is a fissure or crack.

47:13 : Living things refer to microorganisms or bacteria. Concrete that adopts bacteria is also known as bioconcrete. Bacteria in concrete undergo a metabolic activity producing calcium carbonate or calcite precipitation which has similar properties as rock and this process is called biomineralization.

47:40 : A study under financial support from Zach Limflaw Specialist was conducted. Two categories of bacteria were used in the study. First category is two species of bacteria that is Spora sarsenia pasteuri and Bacillus subtilis that were purchased from third-party company.

48:03 : Secondly, three species H1N7 and N10 were obtained from soil and hot spring in Malaysia which is not known species. However, the three unknown bacteria were sent to third-party for DNA sequencing to identify its species. While preparing the bacteria broth solution it involves six activities which first preparing media.

48:35 : Six media were used to cultivate the bacteria and determine the most suitable ones for the bacterial growth to formulate the broth solution for crack treatment. These media were experimented to incubate the bacteria at two different temperatures for bio solution. A loop full of media with bacteria is poured into petri dish and keep it overnight.

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49:06	:	Then the overnight cultures are straight and are incubated for 24 hours. The growth of the bacteria was observed by the appearance colony on the agar plate and cloudiness of the media broth. The observation shows that the Spora sarsenia pasteuri grows well in H4YE.
49:31	:	At temperature 30 and also 37 Celsius while Bacillus subtilis grows in all media at both temperatures. For the three unidentified bacteria H1N7 and N10 it can grow in all media. However, not surprisingly it only grows well in 37 and 50 Celsius because of the source from hot spring.
50:05	:	From the observation under high magnification microscope the shape of the bacteria cell inferring that the bacteria belongs to either gram positive or negative family. Gram is the name of scientists that have identified the positive and negative family of bacteria. Only the positive family able to produce calcite precipitation.
50:34	:	These are the images of five species bacteria chosen in the study that have road shape inferring it belongs to gram positive family. That means it falls under category of bacteria that able to produce calcite precipitation. Different concentrations of bacteria with different amount of urea.
50:59	:	Urea is a catalyst that bacteria likes to eat who are experimented to determine how much or how many bacteria cell and how much urea is needed for the bacteria to actively produce calcite precipitation. The concentration of bacteria is determined using a nanophotometer through optical density or in short OD measurement which implies that the higher amount of bacteria cell more cloudy the media solution is and cause OD reading to be higher. This is typical growth curve of the bacteria.
51:43	:	The lag phase is between 0 to 7 hours. The exponential phase is the phase when the bacteria rapidly grows. Usually it takes about 8 to 44 hours.
51:58	:	The stationary phase is between between 44 hours to 56 hours and at this stage all the nutrients are used up. After 57 hours the death phase is reached. By knowing this growth phase it can exist to decide at which hour is the best phase to cultivate the bacteria cell for preparing the growth solution.

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52:27 : These are the growth curve for five types of the bacteria selected and it shows that the exponential phase for those bacteria is between 3 to 24 hours. There are three methods of test to determine whether the bacteria can produce calcite. First by gram staining test that I explained earlier.

52:49 : Secondly by urease test. In urease test the solidified broth in urea agar is incubated for 24 hours. The color change from yellow to pink or purple means the urea has been consumed or hydrolyzed to produce ammonia and carbon dioxide leading to further reaction to produce calcium carbonate or calcite.

53:18 : Another test is by incubating the bacteria in B4 media for two weeks under microscope. If the precipitation of calcite crystal is formed it means that the bacteria are capable to produce calcite. It is confirmed as the crystal preparation appears for those plates that contain mix of B4 and the bacteria.

53:42 : However, no crystal precipitation appears in the one in control plate. From DNA sequencing test the unknown bacteria is identified as species by electrophoresis process from the nucleotide sequence and inserted into the National Center Bacteriology Information or NCBI website. The species of bacteria can be identified.

54:15 : So the three unknown bacteria are found to be Bacillus proteolyticus for H1, N4, N7 and N10. Both come from Areurinibacillus thermoerophilis species. If we like to name our children with very long name bacteria also have a long name.

54:41 : Two types of specimen were used to create artificial cracks. One is on mortar and another is on concrete just to distinguish the difference of two in terms of healing process. Both the mortar and concrete specimens were cured in water for 28 days.

55:03 : Two methods were adopted to create artificial cracks on mortar and concrete specimens. First method the cracks were made by applying a load to the specimen using universal testing machine or UTM. The crack width created are in the range between 0.1 mm to 0.3 mm.

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55:26 : However, by using this method the crack width and depth cannot be controlled. To obtain persistent crack width and depth another method is used which is by inserting a thin aluminium plate with the size of 3 cm wide and 2 cm deep and 0.3 mm thickness. Experiment on concrete cracks was performed.

55:56 : Three types of broth solution were prepared containing bacteria Spora salsina pasturi that were taken from three different chlorophases of its incubation. One was taken when it just passes leg phase at 24 hours as specimen one at exponential phase 33 hours and 48 hours before reaching stationary phase as specimen two and specimen three respectively with different number of bacterial cells in it. The broth solution made of Spora salsina pasturi was injected into the crack created using 1 ml dropper and monitored for 7, 14, 21 and 28 days.

56:50 : It shows that the crack treated with broth containing highest bacterial cell or 2.88 x 109 cells per ml was filled up at 21 days. The healing efficiency reached 100% at 28 days and the one treated with highest number of bacterial cell which is specimen three reached 100% healing earlier. No calcite precipitation was formed on the non-treated crack.

57:28 : Another work on motile was also conducted at the laboratory scale. It was found that the cracks were fully filled up at 28 days after treated with 10 ml of 1 x 10 to the power 10 cells per ml of Spora salsina pasturi bacterial. Based on the different bacterial cell concentration put in the broth solution and expressed in OD reading at 600 wavelength, it shows that the broth recorded 0.6 to 0.8 OD cell concentration is sufficient to get full healing at 28 days.

58:14 : The healing process was monitored. It shows that at 7 days, fully healing is achieved for the cracks treated with the broth bacterial solution that records 0.6 OD reading. Similar goes to 7 days and also 10 days.

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58:34 : At 28 days after treatment, fully healing are seen for those treated with bacterial broth solution that recorded 0.2, 0.4 up to 0.8. Contrastively, for one OD, it remained unhealed due to the overpopulation of the bacteria which led to a faster death phase and lesser calcite formation. Other broth solutions that made of Bacillus proteolyticus, Bacillus subtilis and Arurinibacillus termoerophilus were also experimented with same amount and same concentration of bacterial cell. Similarly, the full healing is achieved at 14 days and above after treatment.

59:28 : There is intention to improve the healing efficiency time by adding urea which is a catalyst to promote more formation of calcium carbonate from the bacterial hydrolysis. In many cases, it shows that the broth solutions with urea addition do accelerate the healing process. Other series of studies utilizing Bacillus subtilis broth solution with and without urea were conducted.

1:00:01 : Similarly, the full healing is achieved at 14 days. The concentration of 10 to the power 8 cell per mil was found the best concentration to treat the cracks. Similarly to Bacillus proteolyticus, the cracks treated with and without urea for one milliliter broth solution were found to achieve full healing at 14 days.

1:00:30 : It was observed that the cracks treated with Arurinibacillus termoerophilus N7 and N10 broth solution with and without urea also achieved full healing at 14 days. Concentration as low as OD 0.2 reading of Arurinibacillus was found enough to full heal the cracks in motor. Nevertheless, the good about Arurinibacillus termoerophilus it shows sign that the cracks start to fill up as early as three days after the treatment.

1:01:10 : The mineralogical composition of calcium carbonate or calcite crystal filling material in the cracks was carried out by X-ray diffractometer or SRD. From the SRD analysis, all the bacteria isolates namely Spora salsina pasteuri, Bacillus subtilis, Bacillus proteolyticus, N2, N2, N7 and N10. Arurinibacillus termoerophilus showed the production of crystal through the appearance of the intensity of the peaks.

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1:01:49 : The wide precipitation of filling materials in the crack sample was scrapped and crushed after 28 days observation, sieved to minimize the sample size and then was examined under scanning electron microscope or SCM. The filling materials were examined under SCM. It shows the morphology of the filling materials were identical to the morphology of the standard calcium carbonate crystals.

1:02:18 : Therefore, it was confirmed that the calcium carbonate or calcite in the cracks were actually produced by the bacteria. Now, to visualize the works that have been done, please watch the video. It is categorized into two types, namely synthetic base and also protein base.

1:03:58 : This is the chemical or the synthetic forming agent that already diluted and ready to be used to generate and to compress to produce forming agent. One liter cube morphol, 1,400 KeS is needed and cement is 650 Ke, while the water is 141 L. And this is to produce about 900 Ke per liter to get Ke of compound. The mortar mix is poured to the known volume of container.

1:05:21 : This container then filled with the mortar, then the density will be calculated. After the form is added and mixed, the density of the concrete is broken up. As conclusions, concrete has created wonders throughout the evolution while the solutions for the issues are being provided.

1:09:00 : The solutions like use of SCM by product base and recycle aggregate bioconcrete are examples of concrete evolution to reduce the use of cement and natural aggregates and improve the durability of concrete. Plain form concrete can be modified by utilizing WPSA, the paper industry by product and recycle concrete aggregate or RAC. Although it does not contribute much to compressive strength, but it can reduce the consumption of cement and natural sand.

1:09:43 : It is proven that bacteria isolate from local hot spring and soil have the potential as a medium of healing concrete cracks. Eventually, bacteria broth was formulated to thread cracks within shortest time. In my presentation, two evolutions of concrete emphasize the need to incorporate the science of multidisciplinary to find solution that will be impactful on the environment and ensure sustainability.

Program

Professorial Lecture

Dewan Seri Impian, Hotel UiTM Shah Alam

23 August 2022, Jam 2.15 p.m

Nama Prof. Dr. Hjh. Hamidah Mohd Saman

Tajuk The Future & Wonders of Floating & Living Concretes

Jangka masa : 1 jam 23 minit

Transkrip:

1:10:19 : This concrete technology would initiate collaboration that will benefit academia, manufacturers, industries, and the public. Before I end my presentation, I would like to take this opportunity from the bottom of my heart to thank all those who have supported me throughout my journey. I may not be able to mention all, to name a few.

1:10:55 : First, to Professor Engineer Surveyor Dr. Soimi for pushing me to make this event a reality. My ex-dean, Professor Datin Dr. Zainab Mohamad, Professor Dr. Azmi Ibrahim, and Professor Dr. Zakia for their coaching. My industry partners, Mr. Awi Shahdan, Mr. Alex, and Dr. Zak Lim for their moral, materials, and financial support for my research.

1:11:28 : My friend from American Concrete Institute, Malaysia Chapter, Eric, Alex, Mike, Kathiravan, Oscar, and his colleagues. The ex-president of Concrete Society of CSM, Datuk Wira Abu Bakar Mohamad Dia, and Datuk Technologist Dr. Ahmad Roslan, Datuk Engineer Roslan Ahmad Zainuddin, President of Alumni Civil Engineering, UITM, who always be my mentor. My good friend, Bwanseri Haniza Abdulhamid, who always give me motherly advice and comfort. Thank you. Dr. Katini, Dr. Mazida, and Dr. Juraida, for always be with me during my hard and difficult time. My friends from Perwani, who always cheer me up when I am in need.

1:12:26 : My PhD graduates, Dr. Mazna, Dr. Radin, Dr. Mazuki, Dr. Rozaina, Dr. Nohastri, Dr. Izzat, Dr. Noli, Dr. Zalipa, Dr. Zaizatul Akmal, Dr. Ani, Dr. Mohamad Faizal, Dr. Ayman, and Afufidin, who present today to support me. All members from School of Civil Engineering, organizing committee members, led by Associate Professor TS Dr. Cheikh Khairul Izzam, Cheikh Ibrahim, and Dr. Mohamad Khairul. All my industry partners in the concrete circle, my staff from ICANN, and lastly, not to forget, my family, especially my children and my husband, Major Mohamad Zakwan Mohamadnur, for his inspiration and motivation for me to move and continue my journey.

Program

Professorial Lecture

Dewan Seri Impian, Hotel UiTM Shah Alam

23 August 2022, Jam 2.15 p.m

Nama Prof. Dr. Hjh. Hamidah Mohd Saman

Tajuk The Future & Wonders of Floating & Living Concretes

Jangka masa : 1 jam 23 minit

Transkrip:

1:13:30 : I also would like to acknowledge and highly appreciate two of my new collaborators, who are fortunate to be here today, Major General Dato' Paklawan, Engineer Haji Chabitti Rizwan, and Engineer Razali Budin, Vice President TAMCO, Switchgear Malaysia, Sen. Behat, for coming today. And I really hope collaboration happens between College of Engineering, UITM, with Malaysian Armed Forces and TAMCO, Switchgear Malaysia, Sen. With that, I end my presentation. Wa bilahi taufiq wa hidayah.

1:14:08 : Assalamualaikum warahmatullahi wabarakatuh. Thank you. Ladies and gentlemen, the community would like to thank Yang Berbahagia, Professor Dr. Haji Hamidah Mohamad Saman, Dean of Industry, Community and Alumni Network, College of Engineering, UITM, for the great lecture and knowledge sharing.

1:14:37 : Let's give a big applause to Yang Berbahagia, Prof. Hamidah. While Prof. will remain on the stage for the next agenda. Now, we would like to invite Siang Berbahagia, Professor Surveyor, Engineer Dr. Haji Suhaimi Abdul Talib, Assistant Vice-Chancellor, College of Engineering, to be on the stage.

1:15:04 : Please welcome Prof. As mentioned earlier in our event, besides the research on today's Prof. Hamidah lecture, we also have a special quiz on guessing the mass and the density of the concrete as displayed outside. As for that, I have two names with me. And for those who are guessing them right, without further ado, we would like to invite Siang Berbahagia, Professor Surveyor, Engineer Dr. Haji Suhaimi to give away a special prize for the winners.

1:15:57 : For guessing the mass of the concrete, the winner is... Adibah Muhammad Othman from Assistant Vice-Chancellor Office. Congratulations. For guessing the density of the concrete, the winner is... Zainul Shahira, HR Executive from SHRDC.

Program

Professorial Lecture

Dewan Seri Impian, Hotel UiTM Shah Alam

23 August 2022, Jam 2.15 p.m

Nama Prof. Dr. Hjh. Hamidah Mohd Saman

Tajuk The Future & Wonders of Floating & Living Concretes

Jangka masa : 1 jam 23 minit

Transkrip:

1:16:55 : Please welcome. Congratulations to both our winners. Ladies and gentlemen, the committee has prepared a small token to our honoured speaker.

1:17:22 : And we are pleased to invite Yang Berbahagia, Professor Surveyor, Engineer Dr. Haji Suhaimi to give away a token of appreciation to Yang Berbahagia, Prof. Hamidah. Thank you, Prof. And now, we would like to invite all VIPs to be on stage for the photography session. Please welcome.

1:20:55 : Next, we would like to welcome other industry partners to join the group photo on stage. Please welcome. Okay, thank you very much to all the honourable guests.

1:23:04 : And please have a seat.