Questions and Answers in the PIANC Asian Seminar 2022 (Webinar)

Questions to Dr. Mitsuyasu Iwanami
Question 1 Please tell us more about AI-based simulations. Is there any possibility that AI can predict deterioration that could not be predicted by conventional methods?
Answer 1 The AI model was developed by training with plenty of FEM simulation results. The estimated results by AI model was considered valid within the range of training data. In my opinion, the performance of AI simulation cannot be beyond the conventional method.
Question 2 In case a port structure is designed for 30 years, how many % of the construction cost should be provided for maintenance ? How long is the suitable repair interval?
Answer 2 The ratio of maintenance cost to construction cost is dependent on various conditions such as type of structure, environments and usage conditions. It is reported that the maitenance cost is several times
Question 3 Please tell us a little more about the Guidelines for strategic maintenance of port structure in ASEAN.
Answer 3 The guidelines were published based on the fruits of the activitiies of ASEAN-Japan Port Technology Group in order to spread the maitenance principle adopted in Japan. You can download the guideline from the following: http://www.mlit.go.jp/common/000139959.pdf
Question 4 What is the prospect of the introduction of "smart maintenance" which can tell the deterionation level with sensors placed in structures?
Answer 4 Smart maintenance is one of the effective means for reducing the life cycle costs and mitigating the burden of maintenance work in the long run. To realize Smart maintenance, it is necessary to develop the technologies for monitoring the structure's integrity, assesing and predicting the remaining performace, and recovering the performance.

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Questions to Dr. Wanchai Yodsudjai
Question 1 I understood that crystalline materials need to be electronic charged to be effective. In order to apply this material in actual construction, would it be applied as precast members such as secondary concrete products instead of cast-in-place concrete?
Answer 1 Actually, the crystalline materials can be used without the electrical charge. It improve the durability of concrete by having the crystal inside concrete. However, I charged the electricity because I want to have the crystal at the cover of concrete. In the cast of the precast we manage the electrical charge with no problem. For the cast-in-place concrete, I think it can be conducted the charging too if we use the steel formwork.
Question 2 As you mentioned concrete with electoric charge is stonger than the ordinary concrete. I would like to know how about deterioration of the electricized concrete.
Answer 2 I have not much information of the deterioration of the electricized concrete. I think if we apply too much and too long electricity, there may be some problem in concrete. However, with the time and the level of the electricity I used it still not much problem to my concrete.
Question 3 Regarding the material applied to fill the voids in concrete, I would like to know whether there is any specific benefit to choosing the crystalline material rather than other filler material such as fly ash in order to reduce the chloride penetration.
Answer 3 Both of using the crystalline material and using of fly ash can reduce the chloride penetration. However, it has a differences. For fly ash, all over the concrete section is dense; however, my method, the concrete will dense around its surface. Currently, I have no data for comparing between the fly ash and my method; therefore, I am not sure which one is better. It should be the future research work.
Question 4 I am just wondering you may have research project on concreate deterioration due to carbonation as well as chloride of concreate. If you have any recent development in this area, and provide us with comments I appreciate it.
Answer 4 Currently, I still not have a research on the concrete deteriorated due to carbonation as for my opinion the carbonation is less severe than chloride. I am so sorry for that.
Question 5 Is it possible to draw the deterioration curve using chloride change?
Answer 5 For my opinion, it possible to draw the deterioration curve using the chloride change. If the concrete having higher chloride content, the possibility of the deterioration of concrete is high. However, we have to look at others parameters in the same time.

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Questions to Dr. Md. Tarek Uddin
Question 1 Periodical inspection and preventive maintenance of concrete infrastractures are carried out in Bangladesh?
Answer 1 We have policy for periodic inspection and preventive maintenance accordingly. We may need to do work on implementation of the policy in general.
Question 2 Why is brick often used as aggregate in Bangladesh? Also, is natural aggregate less commonly used in Bangladesh?
Answer 2 Bangladesh is a land of delta (a flat land with alluvial deposits of many rivers). We do not have enough rocks for making aggregate for concrete. Therefore, clay burnt brick aggregate is used as aggregate in construction, particularly for low-rise buildings. Due to the environmental concerns associated with brick production, we are trying to reduce production of brick gradually. Stone aggregate imported from abroad is also used in construction. We are producing a very small quantity of stone aggregate locally.
Question 3 1. is the durability of concrete using recycled aggregate inferior to that of normal concrete? 2. Is brick concrete still used in Bangladesh due to lack of aggregate?
Answer 3 1. Yes, concrete made with recycled aggregate shows inferior performance to that of concrete made with virgin aggregate. However, by improving quality of concrete, we can improve the performance. 2. Please refer to the answer of Question 2.
Question 4 What is the concrete density when Brick is used as an aggregates for concrete?
Answer 4 It will be around 2000 kg/m3 to 2100 kg/m3.

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Questions to Dr. Toru Yamaji
Question 1 In design, we consider a crack width at the service state as well. Does the crack width play any role in the durability assessment or estimation of corrosion initiation?
Answer 1 As a matter of fact, when crack widths are large, corrosion starts earlier and progresses more aggressively. The effect of crack is taken into account by increasing the diffusion coefficient when predicting chloride ion penetration in design.
Question 2 In case of planning rehabilitation of reinforced concrete port structures, how to cope with newly revised technical standards? Do you recommend to design rehabilitation following the new technical standards?
Answer 2 The standard describes a method for predicting when corrosion will start. If corrosion has started or progressed, the method is not applicable. If corrosion has not yet started (i.e., chloride penetration is low), the methods described in the standard are applicable.
Question 3 Do galvanized steel bars work in place of epoxy coated bars? Any concerns?
Answer 3 It has been pointed out that galvanized steel bars, which are mainly used in Japan, do not have sufficient corrosion resistance in environments where seawater is supplied in large quantities. It is necessary to know how severe the environment is in which the steel bars are to be applied.