

Unit 13 - Week 11

Course outline

How does an NPTEL online course work?

Prerequisite Assignment

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Case studies on structural repair (Right methodologies and systematic approach / case studies)

Cathodic Protection in Concrete Structures - Laboratory and field studies

Lecture Material

Quiz : Assignment 11

Maintenance and Repair of Concrete Structures : Week 11 Feedback Form

Week 12

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Assignment 11

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-04-22, 23:59 IST.

- 1) The figure shown depicts the damage observed in a residential building. Initially the building got approval to construct G+3 storey. However, the failure was observed after the additional three floors were constructed. For the given conditions, select the most suitable sequence of steps to frame the methodologies from the options given below. 2 points



- I. Visual inspection
- II. Non-destructive tests to determine the strength of concrete
- III. Corrosion survey
- IV. Eliminating the cause for the corrosion
- V. Analyzing the structure for the increased additional loads
- VI. Choosing the compatible repair material and systems
- VII. Understanding the limitations/constraints
- VIII. Protective coatings to protect the material from aggressive environment

- I – III – V – VI
 I – II – III – VII
 I – II – VII – V – VI
 I – II – III – IV – VI - VIII

No, the answer is incorrect. Score: 0

Accepted Answers:
I – II – VII – V – VI

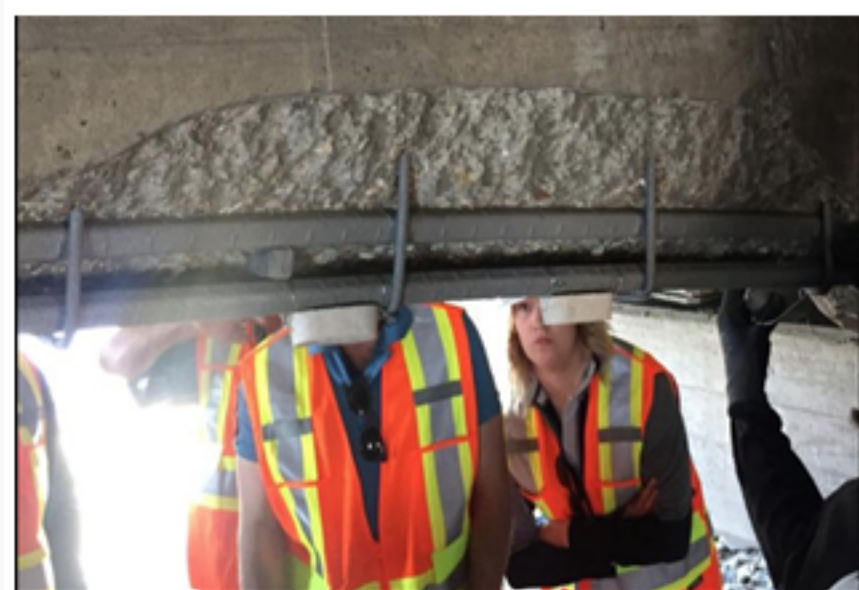
- 2) Which of the following could be the TYPICAL and PRIMARY causes for the degradation of reinforced concrete structures in a chemical plant? 2 points

- Chemicals-induced corrosion of structural elements
 Leakage/seepage of chemicals
 Rainwater leakage through roof
 Faulty structural designs

No, the answer is incorrect. Score: 0

Accepted Answers:
Chemicals-induced corrosion of structural elements
Leakage/seepage of chemicals

- 3) The figure shows a case study discussed in the lecture. What were the repair solutions adopted for this bridge? 2 points



- Undercutting of rebars
 Grit blasting to clean the concrete and steel surfaces
 Zinc rich primer was applied on cleaned steel surfaces
 Sacrificial anodes were installed for cathodic protection

No, the answer is incorrect. Score: 0

Accepted Answers:
Undercutting of rebars
Grit blasting to clean the concrete and steel surfaces
Zinc rich primer was applied on cleaned steel surfaces
Sacrificial anodes were installed for cathodic protection

- 4) The figure shows a case study discussed in the lecture. What type of materials/systems were used in shear strengthening of this bridge? 1 point



- Embedded steel shear stirrups
 U-shaped steel plates
 U-shaped CFRP sheets/bands
 Flexible CFRP fibres glued to the concrete surface

No, the answer is incorrect. Score: 0

Accepted Answers:
U-shaped CFRP sheets/bands

- 5) Select suitable parameters that can be used to assess the efficiency / instantaneous performance of sacrificial anode cathodic protection (SACP) systems in reinforced concrete structures? 2 points

- Polarized and depolarized corrosion potentials of steel
 Ultrasonic pulse velocity
 Chloride ion permeability measured based on ASTM C1202 Standar
 Corrosion rate of steel

No, the answer is incorrect. Score: 0

Accepted Answers:
Polarized and depolarized corrosion potentials of steel
Corrosion rate of steel

- 6) Select the long-term characteristics expected from a properly implemented SACP system in reinforced concrete structures 2 points

- CP system should favour the passivation of the embedded steel reinforcement
 CP system should favour the passivation of the sacrificial anode metal (zinc)
 CP system should supply high current density throughout the design life irrespective of the demand from the reinforcement
 CP system should be self-regulating

No, the answer is incorrect. Score: 0

Accepted Answers:
CP system should favour the passivation of the embedded steel reinforcement
CP system should be self-regulating

- 7) Select the key parameters used for designing the sacrificial anode cathodic protection systems for concrete structures 2 points

- Electrical resistivity of concrete
 Compressive strength of concrete
 Steel density
 Exposure condition, which affects the current demand

No, the answer is incorrect. Score: 0

Accepted Answers:
Electrical resistivity of concrete
Steel density
Exposure condition, which affects the current demand

- 8) Select the key features of a good galvanic anode system for applications in concrete structures. 2 points

- Large surface area of the anode metal to be able to meet the high current demand
 Highly alkaline encapsulating mortar to ensure continued corrosion of zinc anodes
 Encapsulating mortar with disconnected pores
 Anode tie wires should be die-cast into the anode

No, the answer is incorrect. Score: 0

Accepted Answers:
Large surface area of the anode metal to be able to meet the high current demand
Highly alkaline encapsulating mortar to ensure continued corrosion of zinc anodes
Anode tie wires should be die-cast into the anode