

CORROSION OF REINFORCED CONCRETE STRUCTURES

Credits	3 (2.2.5)			Course code	CI3109	
Periods	Total: 60	LT: 30	TH: 30	TN:	ĐA:	BTL/TL:
Evaluation	BT: 10%	TN:	KT: 20%	BTL/TL:		Thi: 70%
Evaluation type	<ul style="list-style-type: none"> - <i>Midterm exam: writing, 45 minutes</i> - <i>Final exam: writing, 90 minutes</i> 					
Prerequisite course						
Previous course	<ul style="list-style-type: none"> Construction Materials Concrete Technology 					
Co-requisite course						
Training field	Technology of Construction Materials					
Standard	Undergraduate					
Course grade	3					
Other notes	<i>Exercise is together with theory class. Theory and exercise spend 3 teaching periods per week for 15 weeks.</i>					

Course Description

The subject provides generality and classification of corrosion of concrete and reinforced concrete, hydration of cement portland and hydrate products of concrete, corrosion of concrete and reinforced concrete in solid, corrosion of concrete and reinforced concrete in the air, corrosion of steel in reinforced concrete, methods to prevent the corrosion of concrete and reinforced concrete.

Study documents

- [1] Các tiêu chuẩn về chống ăn mòn bê tông và bê tông cốt thép – TCVN , ASTM , BS , AFNOR.. – Hà Nội 1977-2000-2003.
- [2] Nguyễn Văn Chánh, Trần Văn Miên, *Ăn mòn và chống ăn mòn bê tông cốt thép*, NXB Đại Học Quốc Gia TP.HCM, năm 2010.
- [3] Concrete Corrosion and concrete Protection, Imre Biczok, Chemical Publishing New York 1967.
- [4] Durability of Reinforced Concrete in Aggressive Media, SN. Alekseev & F.M. Ivanov & S Modry, Brookfield 1993.
- [5] Fundamentals of Durable Reinforced Concrete, Mark. G. Richardson, Published by Spon Press, London

2002.

Course Goals

- Classification of concrete degradation and reinforced concrete corrosion;
- Understand microstructure of concrete;
- Analysis of concrete degradation;
- Use modeling tools to calculate concrete corrosion;
- Be able to propose methods to increase durability of concrete.

Course Outcomes

STT	Course learning outcomes	CDIO
L.O.1	Apply basically scientific knowledge and specific knowledge	1.1, 1.3
	L.O.1.1- Remind inorganic reaction	1.1.6
	L.O.1.2- Remind theories of mass transfer in material	1.1.5 1.3.15
	L.O.1.3- Apply knowledge of physics, chemistry and physical chemistry to increase durability of reinforced concrete structures	
L.O.2	Specification and classification of corrosion of concrete and reinforced concrete	2.3, 2.4
	L.O.2.1- Specification of corrosion of concrete and reinforced concrete	2.3.1, 2.3.2
	L.O.2.2- Classification of corrosion of concrete and reinforced concrete	2.3.4, 2.4.2
L.O.3	Understand microstructure of harden paste and concrete	2.1, 2.3
	L.O.3.1- Determine hydrates and properties of cement hydrates	2.1.2, 2.1.5
	L.O.3.2- Understand microstructure of concrete	2.1.3, 2.3.3
L.O.4	Describe and analyze corrosion types of concrete and reinforced concrete in aggressive media	1.2, 1.3, 2.3, 2.5
	L.O.4.1 – Describe corrosion types of concrete and reinforced concrete	1.2.8, 2.3.1
	L.O.4.2 – Understand and analyze corrosion types of concrete and reinforced concrete	1.3.15, 2.5.4, 2.3.4
L.O.5	Use software and tools to determine properties of reinforced concrete under aggressive media	4.4, 4.5
	L.O.5.1 – Use software and tools	4.4.1, 4.4.2
	L.O.5.2 – Model progress of corrosion of reinforced concrete by software	4.4.3, 4.5.1

		4.5.2
L.O.6	Be able to promote methods and organize work for repair corrosion of reinforced concrete	3.1, 4.4, 4.5
	L.O.6.1 – Design or promote methods to increase durability of reinforced concrete	4.4.1, 4.4.7
	L.O.6.2 – Organize work for repairing reinforced concrete	3.1.2, 4.5.5

Learning strategies & Assessment scheme

Total score of course includes:

- Exercise : 10%
- Midterm exam: 20%
- Final exam : 70%.

Instructors

Assoc. Prof. Tran Van Mien