

STORAGE STRUCTURES

Offering Branches	CE	Credits:	4
Course Category:	Honors Course	Lecture-Tutorial-Practical:	3-1-0
Course Type:	Theory	Continuous Evaluation:	30
Prerequisites:	Nil	Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Design the steel water tanks such as pressed water tank and water tanks with hemispherical bottom.	K6
CO2	Design concrete water tanks like elevated rectangular water tank, circular tank and underground tanks.	K6
CO3	Apply the design concepts in the design of steel bunkers and silos.	K3
CO4	Design Concrete square bunker and cylindrical silo	K6
CO5	Design prestressed concrete circular water tanks	K6

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	3						3	2	3
CO2	2	2	2	2	2	3						3	2	3
CO3	3	3	3	3	3	2						2	3	2
CO4	2	2	2	2	2	3						3	2	3
CO5	2	2	2	2	2	3						3	2	3
Avg.	2	2	2	2	2	3						3	2	3

1- Low

2-Medium

3-High

Course Content

UNIT-1	STEEL WATER TAKS Design of rectangular riveted steel water tank - Tee covers - Plates - Stays - Longitudinal and transverse beams - Design of staging - Base plates - Foundation and anchor bolts - Design of pressed steel water tank - Design of stays - Joints - Design of hemispherical bottom water tank -side plates - Bottom plates - joints - Ring girder - Design of staging and foundation.	CO1
UNIT-2	CONCRETE WATER TANKS Design of Circular tanks - Hinged and fixed at the base - IS method of calculating shear forces and moments - Hoop tension - Design of intze tank - Dome - Ring girders - Conical dome - Staging -Bracings - Raft foundation - Design of rectangular tanks - Approximate methods and IS methods -Design of underground tanks - Design of base slab and side wall - Check for uplift.	CO2
UNIT-3	STEEL BUNKERS AND SILOS Design of square bunker - Jansen's and Airy's theories - IS Codal provisions - Design of side plates -Stiffeners - Hooper - Longitudinal beams - Design of cylindrical silo - Side plates - Ring girder -stiffeners.	CO3
UNIT-4	CONCRETE BUNKERS AND SILOS Design of square bunker - Side Walls - Hopper bottom - Top and bottom edge beams - Design of cylindrical silo - Wall portion - Design of conical hopper - Ring beam at junction.	CO4
UNIT-5	PRESTRESSED CONCRETE WATER TANKS Principles of circular prestressing - Design of prestressed concrete circular water tanks..	CO5

Learning Resources

Text Books	1. Rajagopalan K., Storage Structures, Tata McGraw-Hill, New Delhi, 1998. 2. Krishna Raju N., Advanced Reinforced Concrete Design, CBS Publishers and Distributors, New Delhi, 1998.
Reference	1. S.S.bhavikatti, Advanced Reinforced Concrete design, New age interntional

Books	publishers,2016. 2. Krishna Raju N., prestressed Concrete, Tata Mc graw Hill publishing company Ltd , New Delhi, 2018.
e-resources Material	1. app-u.pulsetip.com/assessing_loads_on_silos_and_other_bulk_storage_structures.pdf 2. https://books.google.co.in/books?id=2iyUCgAAQBAJ