



Nilachal Polytechnic

Bhubaneswar

Sem. : 6th Subject : ACT

Branch: Civil Engineering

Name of the Faculty : Sweta Sarangi

Text Book to be followed by Student / Faculty

Book- :

Chapter- 4 : Retrofitting of Structures

1.Learning Objectives

Student will learn –

About Retrofitting of structure and seismic retrofitting.

About the types of retrofitting.

About Shear wall, Base-Isolation Technique, Wing wall,

About Jacketing.

2. Essential Questions

What is jacketing?

Define Retrofitting of structure?

What do you mean by building configuration?

What are the various types of Retrofitting?

Classify the various technique of retrofitting structure?

3. Hours Required

Theory	2 hours
Problems	nil
Question & Answer Theory	1 hour
Total	3 hours

4. Question for Teaching / Assignment / Self Practice

Question sets	02 Marks	05 Marks	10Marks
Teaching	3	2	1
Assignment	2	1	1
Self Practice	1	1	1
Total	6 no.s	4 no.s	3 no.s

Lesson Description:-

Retrofitting is making changes to an existing building to protect it from flooding or other hazards such as high winds and earthquakes. The aftermath of an earthquake manifests great devastation due to unpredicted Seismic motion striking extensive damage to innumerable buildings varying degree i.e. either full or partial or slight. This damage to structures in its turn causes irreparable loss of life with a large number of casualties.

It has been observed that majority of such earthquake damaged buildings may be safely reused, if they converted into seismically resistance structures by employing a few retrofitting measures.

Moreover it has often been seen that retrofitting of buildings is generally more Economical as compared to demolition and reconstruction even in case of severe structural damage.

Therefore, seismic retrofitting of building structures is one of the most important aspects for mitigating seismic hazards especially in earthquake-prone countries.

Course Material

CHAPTER 4

Retrofitting Of Structure

Jacketing:-

- (i) Jacketing is the process in which we cover the structural members of a building to increase the strength of the building.
- (ii) In this technique we use fiber reinforced concrete along with nominal steel reinforcement to increase the strength of the structural members.

Discontinuous load path

- (i) Vertical loads must be transferred from slabs to beams, then from beams to columns and then from columns to footings.
- (ii) Horizontal loads must be transferred from horizontal frames to columns, then from columns to footings.
- (iii) If the load does not follow these paths then the load path is discontinuous.

Retrofitting of buildings or Structures or seismic retrofitting

It is the modification of existing structures to make them more resistant to seismic activity, ground motion or soil failure due to earthquake.

It is defined as the process of increasing the earthquake resistance of damaged or weak building by appropriate techniques.

Retrofitting

Retrofitting is the process of modification of existing structural members to increase the strength of resistance to loads.

Retrofitting refers to the addition of new technology or features to the older systems.

Sources of weakness in RCC framed building are:

During earthquake the failure occurs at the weaker points in the structure.

The main sources of weakness in RC frame building are-

Discontinuous load path/ irregular load path.

Lack of deformation

Quality of workmanship and poor quality of materials

Discontinuous load path/ irregular load path

Every structure must have 2 load resisting systems

Vertical loads resisting system for transferring the vertical load to the ground.

Horizontal load resisting systems for transferring the horizontal loads to the vertical load system.

Load should be properly collected by the horizontal framing system and properly transferred in to vertical lateral resisting system.

Any discontinuity / irregularity in this load path or load transfer may cause one of the major contributions to structures damages during strong earthquakes.

Lack of deformation

The load resisting frame must have sufficient ductility to resist earthquake loads.

The structural configuration should be such that the earthquake load are distributed properly to the structural members.

Quality of workmanship and poor quality of materials

If the materials are used in construction is of poor quality, then the loads cannot be transferred properly and damage may occurs.

If the quality of construction work is bad, then load transfer path of the structure may be deviated and the structure may collapse during earthquake.

Question set

Classroom Teaching

Group A

Differentiate between retrofitting and rehabilitation of buildings.

What is jacketing? [2017S]

Define discontinuous load path.

Group-B

Classify techniques used in retrofitting of buildings.

[2015(s)2015(w)2016(s),2014(s) 2018s]

What is local retrofitting? Differentiate between conventional & non-conventional method of retrofitting.

Group-C

Give an account of sources of weakness in RC framed building in seismic retrofitting of reinforced concrete buildings. [2015(s), 2014s]

Assignment Questions

Group-A

What do you mean by retrofitting of buildings or structures? 2014(w),2015(s)

Define seismic retrofitting. 2016(s)

Group-B

What are the sources of weakness in RCC framed building? 2014(w),[2016(s)]

Group-C

Briefly describe the retrofitting strategies for RC buildings. [2016S]

Self Practice

Group-A

Define retrofitting

Group B

Differentiate between conventional and non-conventional retrofitting.

Group C

Describe global retrofitting?

Faculty

HOD

Principal