

## **DETAILING OF STRUCTURES-R.C.C IN SITU MEMBERS.**

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Detailing is required as an essential part of the DESIGNER and the design details should be put in paper so that the site supervisor has no doubt on casting the member as per the detail. Even though the designer uses super program with super computer if he fails to translate his design details very clearly then there will be a cause of failure of the structure may be in the form of cracks to a minimum extent.

Construction details have a heavy impact on the actual quality of the concrete in a structure.

Satisfactory construction detailing plays an essential role in concrete structure durability. Such details affect performance in any number of ways, including the aspects listed below.

- (a) They contribute to appropriate cover over reinforcement, preventing corrosion during the expected design life.
- (b) They control shrinkage and thermal contraction cracking.
- (c) They control cracking due to reinforcement elongation.
- (d) They prevent cracking in anchorage and curved areas.
- (e) They prevent cracking due to excessive local compressive stress in the concrete.

Construction detailing in the design not only has an impact on the safety and cost of built structures, but on their durability as well.

Detailing of structure depends on the type of construction, type of material and type of structural members.

Detailing is required for:

- a. Reinforced concrete member which is cast-in-situ.
  - 1. For gravity loads.
  - 2. For lateral loads-Earthquake forces, flood, earth water etc.
- b. Reinforced concrete member which is precast units.
- c. Reinforced concrete member which is having prestress or post tension wires.
- d. Steel structures.
- e. Earth retaining structures.
- f. Special structures like thin space structures-shells
- g. Detailing for masonry structures.

Proper cover shall be specified depending on the concrete structure exposed to:

1. Carbonation induced corrosion;
2. Chloride induced corrosion;
3. Chloride induced corrosion from SEA water;
4. Freeze and thaw attack; and
5. Chemical attack.

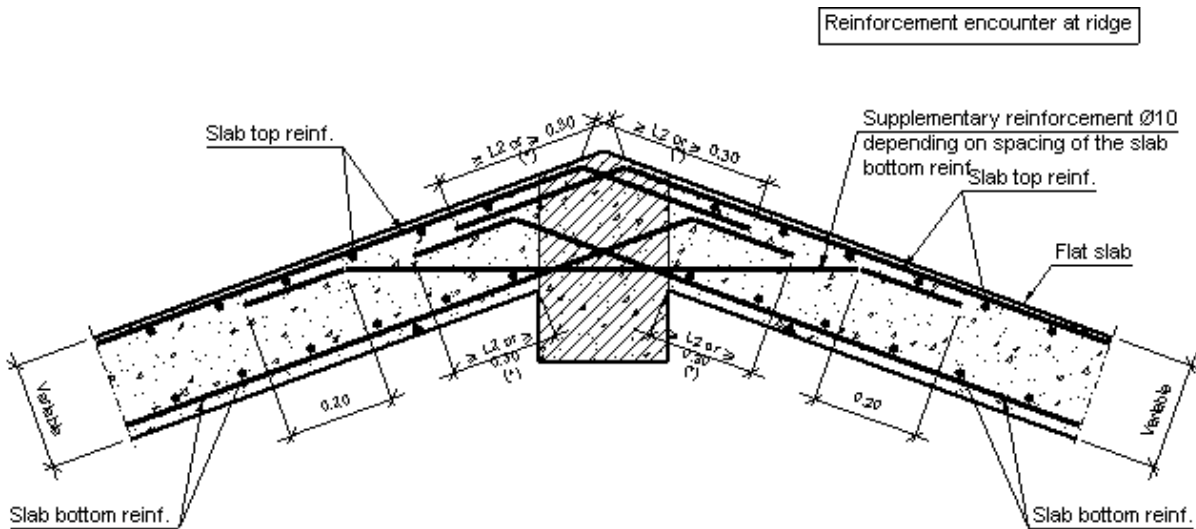
Detailing should be done by specifying proper cover as per the above circumstances.

The details shall be prepared with the following priorities in mind:

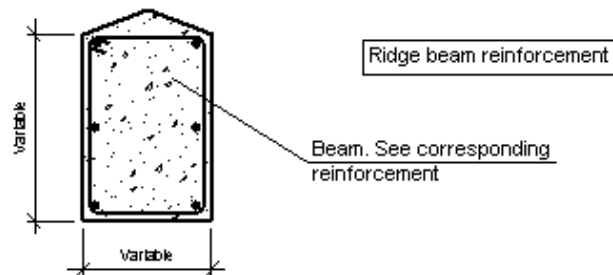
- technical correctness and safety
- buildability and speed of construction
- labour and material costs.

Below some detailing are furnished:

**a. INCLINED SLOPED RIDGE OF A SLAB.**



(\*) Values to be established depending on whether it is the positive or negative bending leaving the top or bottom reinforcement in tension. See tables in detail FIX110.



**b. TWO WAY SLAB DETAILING USING BENT UP BAR OR STRAIGHT BARS.**

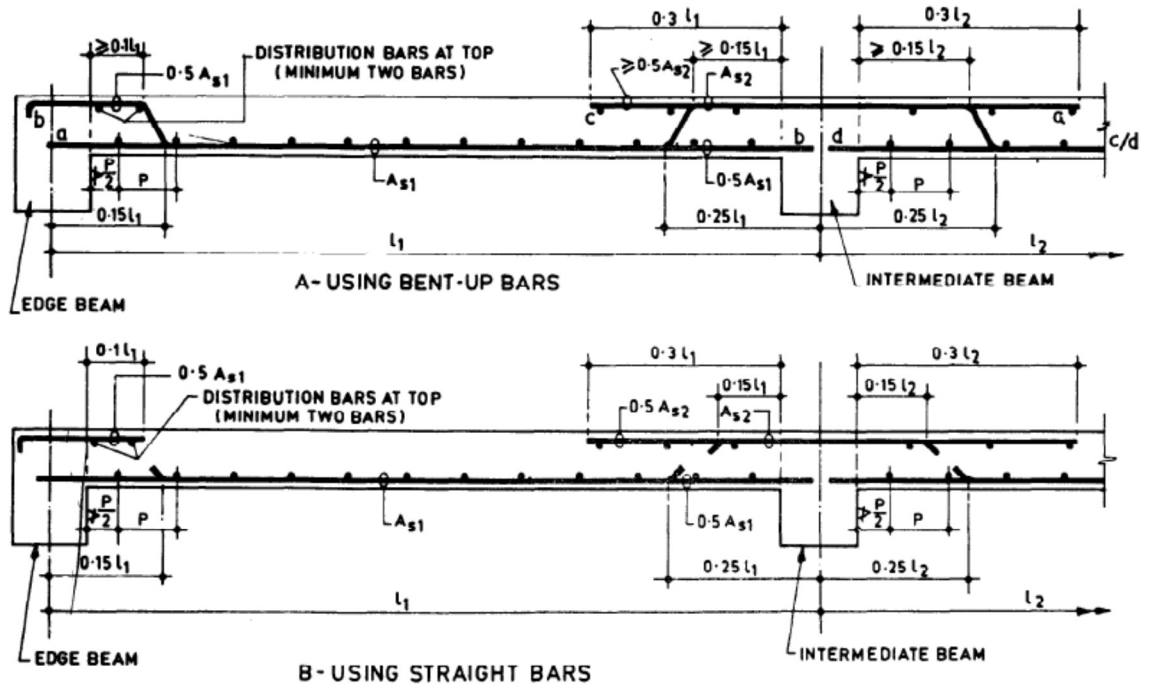
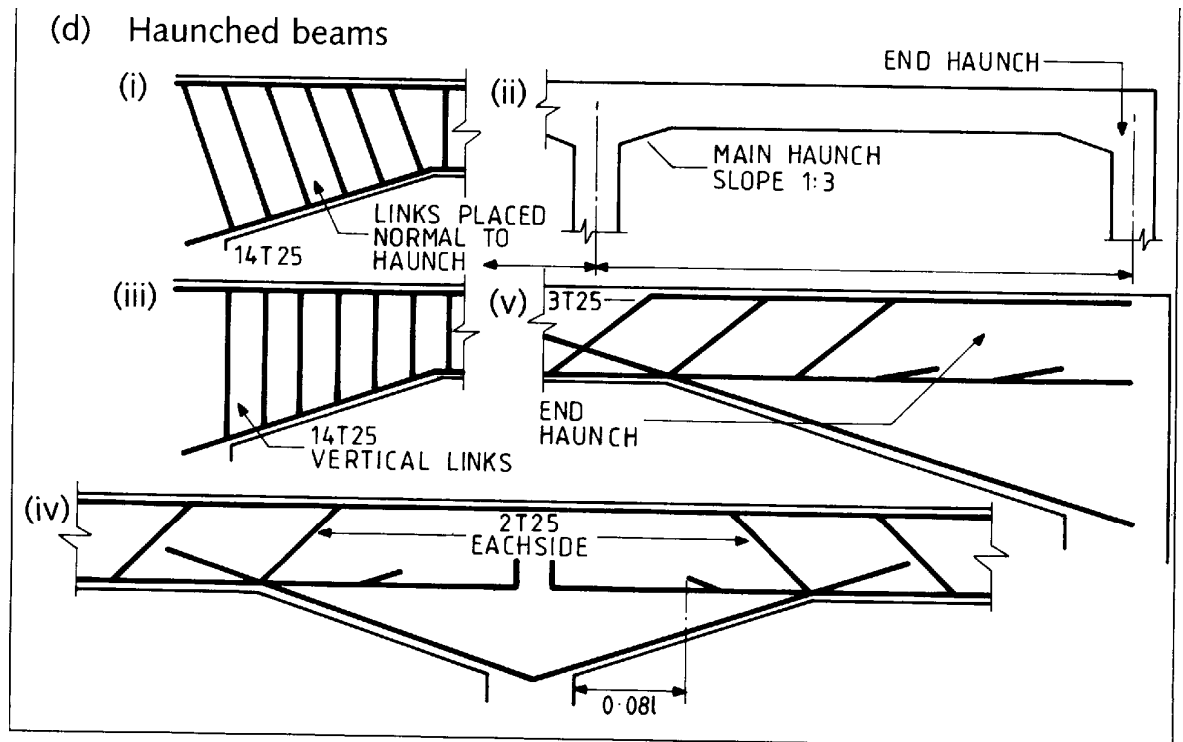
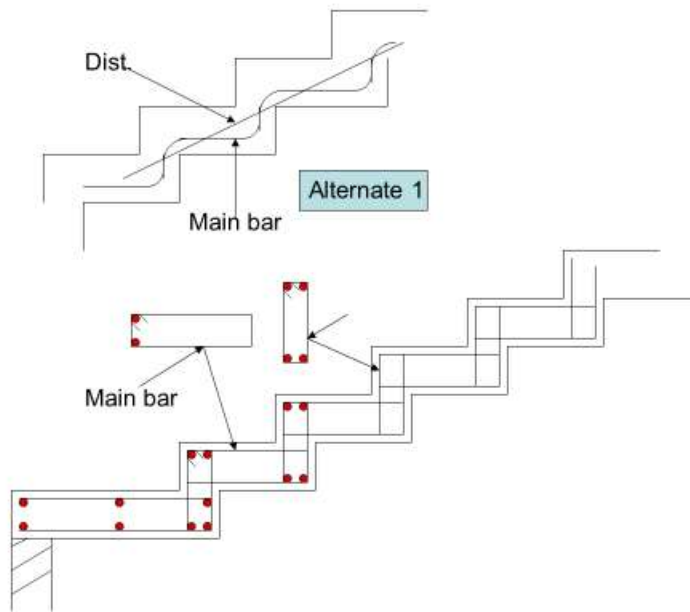


FIG. 9.5 SIMPLIFIED RULES FOR CURTAILMENT OF BARS—SECTION THROUGH MIDDLE STRIP

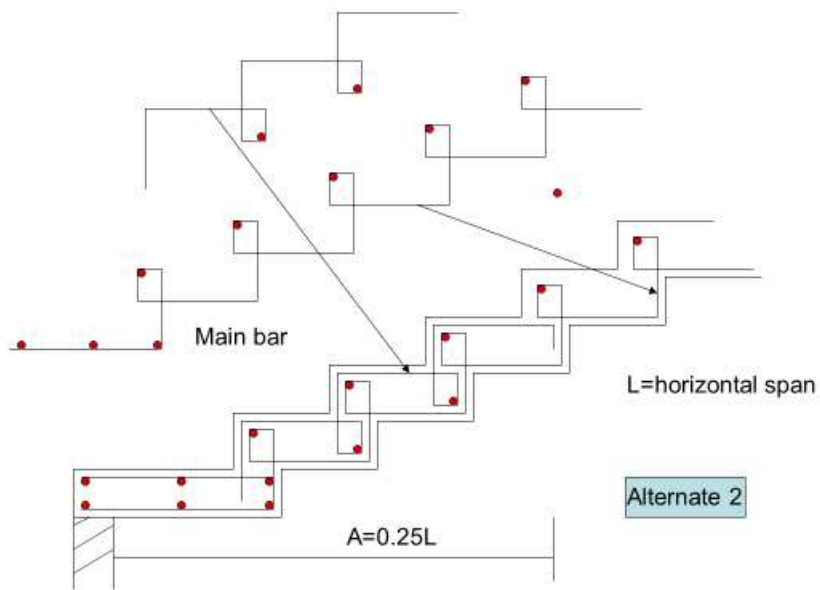
**C. HAUNCHED BEAM DETAILS.**



**SLABLESS STAIRCASE**



**SLABLESS STAIRCASE**



Technical notes to accompany any reinforced concrete structural drawing”

## NOTES:

1. CONCRETE GRADE : M25
2. STEEL GRADE :  $F_y 415/\text{mm}^2$ .
3. THE BEARING CAPACITY TAKEN :  $215\text{Kn}/\text{m}^2$   
(based on site soil condition)
4. THE LIVE LOAD AS PER IS:875:  $2\text{Kn}/\text{m}^2$   
(FOR Residential Buildings)

THE LIVE LOAD AS PER IS:875:  $1.5\text{Kn}/\text{m}^2$ (FOR ROOF)

5. THE DESIGN IS CARRIED OUT WITH EQ FORCES  
AS PER IS:1893-Part 1
6. THE CODES USED ARE:
  - a. IS 56:2000.
  - b. IS 1893-2000-Part1
  - c. IS 13920:1993
  - d. IS 4326
  - e. IS 875
  - f. SP 34: HB ON DETAILING.

7. THE LOAD FOR BRICK PARTITION IS TAKEN AS 1KN/SQ.M  
WHEN LOCATION IS UNKOWN.

8. THE COVER FOR :

a. FOR FOUNDATION MEMBERS(SOIL SIDE) :3"

c. COLUMN :1-1/2"

b. FOR FOUNDATION MEMBERS(PCC SIDE) :2"

d. BEAMS :2"

e. SLAB :15mm

9. OVER LAPS SHALL BE:50Ø

10.OVERLAPS SHALL BE STAGGERED.

11. USE TRIAL MIX BEFORE STARTING THE PROJECT.

12.ANY DISCRIPENCY SHALL BE BROUGHT TO THE  
NOTICE OF ENGINEER.

13.THIS DRAWING IS TO READ AND NOT TO MEASURE.

14.CHANGES TO BE MADE AT SITE SHALL BE CONSULTED  
WTH THE CONSULTING ENGINEER/DESIGN ENGINEER.

As the detailing is not taught at most of the colleges it is only learned through experience and seminars and workshop conducted with those experienced engineers. Many references are available and some of them are listed below.

#### **REFERENCES:**

1. MANUAL OF DETAILING REINFORCED CONCRETE STRUCTURES TO EC2  
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2. HANDBOOK ON CONCRETE REINFORCEMENT AND DETAILING-  
SP:34(S&T)-1987.

3. MANUAL OF ENGINEERING & PLACING DRAWINGS FOR REINFORCED CONCRETE STRUCTURES-(ACI 315-80
4. MANUAL OF STANDARD PRACTICE –CONCRETE REINFORCING STEEL INSTITUTE.
5. TWARD BOARD MANUAL FOR RURAL WATER SUPPLY SCHEMES.
6. DESIGN PRINCIPLES AND DETAILING OF CONCRETE STRUCTURES. By D.S.PRAKASH RAO.
7. SIMPLIFIED DESIGN-RC BUILDINGS OF MODERATE SIZE AND HEIGHT-BY PORTLAND CEMENT ASSOCIATION,USA.
8. DESIGN AND CONSTRUCTION FAILURES BY DOV KAMINETZKY.
9. IS:2502-1963 CODE OF PRACTICE FOR BENDING AND FIXING OF BARS FOR CONCRETE REINFORCEMENT.
- 10.IS:1893:2000.
- 11.IS:4326.
- 12.IS:456:2000
- 13.REINFORCED HAND BOOK BY REYNOLD.
14. POWER POINT PRESENTATION ON REINFORCING DETAILING OF R.C.C MEMBERS BY Er.T.Rangarajan during the FOCUS course to engineering student.
15. STANDARD METHOD OF DETAILING OD STRUCTURAL CONCRETE -UK INSITUTE OF STRUCTURAL ENGG,
- 16.Structural Details In Concrete BY Bangash
- 17.HANDBOOK ON REINFORCEMENT AND DETAILING-SP34.