

(57)

DELHI DEVELOPMENT AUTHORITY
CENTRAL DESIGN ORGANISATION

NO: CE(D)TC/(13)/84/DDA/ 588-614

Dt: April 21, 1994

27

CIRCULAR -20

SUB: GENERAL INSTRUCTIONS FOR STRUCTURAL DESIGNS.

Certain general instructions were issued by Chief Engineer (Design) vide Circular No. 19 dated 7.5.92. These instructions have been modified with some additions and are re-circulated through this office circular No.-20. It is requested that these instructions may be circulated to all the Engineers, working under your control.

Encl: 4 Sheets.

4/27/94
d/c (Y.L. BANKA)
CHIEF ENGINEER (DESIGN)

ALL CHIEF ENGINEERS/ DDA

Copy along with enclosures forwarded to:-

1. All S.E.s (Civil Circle _____) for further necessary action.
2. All Ex. Engineers (Design), CDO for information.

1
d/c S.E. (DESIGN) 27/4/94

(A) GENERAL NOTES

1. The work shall be taken up only for the approved scheme.
2. All dimensions are in mm. unless otherwise specified.
3. In case of any discrepancy in drawing or site conditions, the same shall be brought to the notice of Central Design Organisation for reconciliation before execution.
4. No dimension shall be scaled out, only written dimensions shall be followed.
5. All centre line dimensions shall be extracted from the Architectural Drawings.
6. If the area requires any filling, such filling would be kept to the minimum and plinth level would be decided accordingly. Filling of earth shall be done simultaneously for equal depths on both sides of the wall.
7. If it is a filled up area it should be ensured that the foundation rests on the original/virgin soil.
8. It may be ensured by the Executive Engineer In-Charge that houses/building under construction are situated sufficiently away from a retaining wall, nallah, well, ditch or low lying area, so as to ensure stability of soil. If necessary Soil Consultants/Central Design Organisation should be consulted.
9. It must be ensured by E.E. In-charge that there existed no nallah water course at site which might have been filled up and may get activated leading to ingress of water below foundations and partial settlement thereof. Effective drainage arrangement shall be made for life time of the structure.
10. 115mm thick walls are to be treated as non-load bearing, which will be constructed after desluttering the slab above.
11. Lintel Band shall be provided on all the floors for load bearing masonry structures.
12. Projections provided for ornamental effects in elevation shall be suitably anchored back to the main structure.
13. Masonry where supported on cantilevers shall be firmly tied to the main structure in accordance with IS-4326.

14. Between adjoining footings at different levels, a clear horizontal distance shall be maintained so that slope of the joining line of footing beds is not steeper than 1 vertical : 2 horizontal. Where required, suitable longitudinal drop in steps shall be provided in the foundation bed, maintaining a slope not steeper than 1 vertical : 2 horizontal for the cross walls also.
15. Design for compound/partition walls and plinth protection shall be finalised by the Executive Engineer in-charge.
16. Expansion joints are to be provided as per codal requirements (IS-3414 and IS-4326).

(B) ADDITIONAL NOTES FOR LOAD BEARING MASONRY CONSTRUCTION

1. All the provisions of IS-1905 shall be followed.
2. Cement mortar for foundation masonry with bricks 75 designation shall be 1:6 (1 cement : 6 Fine sand) from foundation level to first off set below plinth.
3. Load bearing masonry walls are shown hatched in the plan.
4. No shuttering shall be provided for the column faces flushing 230mm thick masonry walls. The walls shall be constructed prior to the casting of the columns. So as to provide proper bond between RCC and masonry. Alternatively proper stitching shall be provided between RCC and masonry.
5. Lintel ^{bands} (bands) shall be provided in all storeys.
6. Lintel band reinforcement shall be continuous through columns, lintels over openings and junctions of walls.
7. Suitable bed blocks shall be provided under the beams.
8. 230mm load bearing brick work in cup board, provided in the rooms, will be stopped at lintel level for casting loft slab over it. Further brick work shall be raised over the loft slab for supporting floor slab. Brick work in cupboard portion shall be continuous from foundation to the terrace level.
9. 200mm thick lean concrete shall be provided under masonry wall sections unless specified otherwise.
10. There shall be no change in the position of load bearing walls from floor to floor unless specified otherwise.

11. Thickness of walls shall not be reduced for any fixtures. In case such recession in masonry is necessary, reinforced cement concrete precast box of suitable shape shall be provided when brick work proceeds.

(C) ADDITIONAL NOTES FOR RCC WORK

1. All the provisions of IS-456 shall be followed.
2. Unless noted otherwise, all reinforced cement concretework shall be done in 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) as per CPWD specifications - 1977.
3. High yield strength deformed bars of IS-1786 (Grade Fe415) and/or TMT bars of grade 400 (SAIL) shall be used.
4. Generally not more than 1/3rd of the steel reinforcement shall be lapped at one location. Special case, if any, be brought to the notice of C.D.O.
5. The development length for reinforcement in tension, unless otherwise specified, shall be 57 times the bar diameter (57 d) for concrete mix 1:2:4 and (47 d) for the concrete mix 1:1½:3.
6. Clear cover to main reinforcement shall be as follows.

i)	Slab	15mm
ii)	Beams	25mm
iii)	Column	40mm
iv)	Footings	75mm
7. Distribution reinforcement for suspended floor slabs, not shown in the drawing, shall be provided as 8 ϕ R @ 300 c/c.
8. Floor slabs, except otherwise specified, are 100mm thick. Reinforcement detailing shall be done as per bar bending schedule.
9. For all beams bearing shall be structurally stable/sound.
10. Depressions in slabs where indicated are the maximum permissible. These may be reduced as per site requirements.
11. Bearing for the slab shall be for full brick width of the wall/beam.
12. 75mm thick lean concrete shall be provided under RCC

foundations.

13. Height of the columns pedestal (including depth of the footing) shall be not less than 45 X largest dia of the column bar.
14. Clear height of the pedestal shall not exceed three times the smaller lateral dimension of the pedestal.
15. Suitable camber shall be provided for the large spanned and cantilever members. Centering for the cantilevers shall be removed only after adequate counter weight is available.
16. Side face reinforcement shall be provided for beams where depth of the web is more than 750mm.

Shukla S
26/4/84
SUPERINTENDING ENGINEER (DESIGN)

DELHI DEVELOPMENT AUTHORITY
CENTRAL DESIGN ORGANISATION
OFFICE OF THE CHIEF ENGINEER (DESIGN)
(14th Floor, Vikas Minar, New Delhi-110002)

Circular No: *CE(D) 72 (13) 284/MDA/10.2.8* Dated: *15/9/94*

CIRCULAR NO.21

SUB: BASIC COMPUTER TRAINING INCLUDING COMPUTER
AIDED DESIGN FOR STRUCTURES AND SERVICES

C.D.O. invites the nominations sponsored by EEs and above of willing engineers who are interested in the above said training programme. They shall be imparted working knowledge of computer including computer aided design for the structures and services between 4.00 PM to 5.00 PM daily at Vikas Minar as per the schedule which will be formulated after the sponsored names are received. It is proposed to start the training w.e.f. 10.10.94 for a period of two and half months each batch of 10 engineers.

This circular be brought to the notice of all JEs/AEs/EEs(Civ.1) so that options ~~are~~ given through the concerned Engineers reach the undersigned by 30.9.1994.

15/9
✓ (E.Y.L.BANKA)
Chief Engineer (Design)

All CEs, SEs, EEs, Dir(MM), Commr.(S&T),
Commr.(L&D), Commr.(LM).

NOO:

Copy to: E.M., DDA for kind information please.

15/9
✓ Chief Engineer (Design)

(63)

OFFICE OF THE SUPTDG ENGINEER (DESIGN)
CENTRAL DESIGN ORGANISATION,
DELHI DEVELOPMENT AUTHORITY

NO. : R2(32)/SE(SP&D)/DDA/36

DT. : 23/3/99

To

ALL CHIEF ENGINEER
DELHI DEVELOPMENT AUTHORITY
NEW DELHI

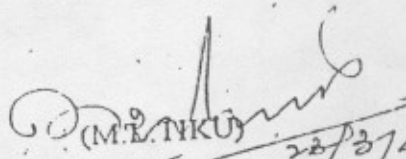
DYN
-11 EC(D)2
26/3/99

SUB:- Basic Soil Parameters for Soil Investigation for C/O Multi-Storeyed Building in D.D.A.

Enclosed is the Preliminary Basic Data required for Soil Investigations of Multi-Storeyed Buildings to be constructed by DDA. From the perusal of the Data it may be seen that broad aspects of Soil Parameters have been identified to be investigated. However, all Field Engineers are free to conduct any other relevant Test deemed necessary or the extent of the depth of Exploration if deemed essential during the Investigations.

The Type Design of the Foundation shall be decided by the Competent Authority on the basis of the Recommendations received from the Soil Consultant after scrutinizing relevant Soil Data. The scope of the work must include that the Consultant shall be required to interact with CDO before the final Type Design of the Foundation is decided.

All Engineers are free at their level to add any other additional information according to the site conditions so that, appropriate Investigations are conducted in the manner stipulated in the relevant IS Code.


(M.L. NKU)
22/3/99
SUPTDG. ENGINEER (DESIGN)

Copy to :

1. EM/DDA, for information please.
2. Sh. panchal, EO to EM/DDA



Please issue to all Ams for in. 9 at their ends.
LDC
26/3/99

SUPTDG. ENGINEER (DESIGN)

Copy to:-

1. Shri Saya Prakash A.E.
2. Shri Anssar Ahmaed A.E.
3. Shri Arfi Ali A.E.

Kail
26/3/88
(Er. OM Prakash)

EE(D V-C.D.O.

PRELIMINARY BASIC DATA REQUIRED FOR SOIL INVESTIGATION FOR MULTI- STOREYED BUILDING

1. INVESTIGATIONS:-

INSITU TESTS:-

I) DCP TESTS:-

DCP tests shall be conducted according to IS code 4968 Pt.II 1976 and other related provisions provided in various codes. The size of the cone shall be strictly in accordance with the provisions of the IS code. DCP tests is mandatory for cohesive soil and can be treated optional for soil wherever Rocks, Boulders, Gravels etc. are apparently seen.

II) SPT TEST :-

The number of Bore Holes shall be decided on Block to Block basis. Block length shall be assumed between the Expansion Joint which is generally not more than 45 m. Atleast two Bore Holes shall be provided in each Block.

- a) The number of Bore Holes may be increased /decreased depending upon topography / strata identified at the site. Bore hole in the open area within the block (if any) shall be avoided unless deemed necessary.
- b) The depth of Exploration shall be atleast 1.5 times the width of the block or 40 m which ever is more.
- c) Sub-soil water level shall be identified for each bore hole.

2. SAMPLING :-

i) UDS (Undisturbed Soil Sample) :-

UDS shall be collected at every change in the strata and or at intervals not exceeding 1.5 m within the continuous strata as prescribed in IS code.

ii) Plate load Test :-

The Plate load Test shall be conducted as per relevant IS Code wherever deemed necessary.

contd....2

III) Chemical Test :-

The Chemical Test of the Soil and Sub-soil water shall be got conducted to identify the presence of injurious chemicals if any, deemed harmful for the Pile/Raft

iv) Any Other Test :-

Field Engineers are free to undertake/ conduct any other relevant test deemed necessary considering the Topography and or the Soil Strata according to the site condition.

3. LABORATORY TESTS :-

i) All relevant Laboratory Test as are stated in relevant IS code shall be done to work out values in respect of :-

a) c, ϕ , Void Ratio, Liquid Limit, Plastic Limit, Sp.Gr., Dry Density, Sat. Density, Bulk Density, Natural Moisture Content and Soil classifications etc.

b) In case of Clay Soil, Soil parameters with C_c (compression Index) in v coeff. of volume change, Unconfined Compressive Strength etc. Shall be worked out and calculations attached with the report.

4. ASSESSMENT OF SBC :-

The SBC shall be made at various levels with reference to :-

i) At the anticipated depth of the Foundation for building block and at below the level of the Lift well as well

ii) Basement level if proposed in the Plan.

All the calculations in accordance to the relevant provision of IS Codes shall be worked out and attached with the Report. The Net and Gross Safe Bearing Pressure shall be worked out both according to Shear and also according to Settlement Criteria.

iii) Modulus of Sub-grade Reaction :-

The horizontal as well as Vertical Modulus of Sub-grade Reaction shall be worked out from the actual Field Test like Plate Load Test or any other appropriate Test.

contd....3

PRESNTATION OF THE REPORT :-

The report shall includes :-

- i) Layout Plan showing the Bore holes and Neighbouring Structures. Features like Drains, Ponds if existing within the Plot/adjecent to the Plot shall also be shown in the Plan.
- ii) Appropriate Contour Plan shall be prepared particularly wherever the Ground is undulated
- iii) Proposed Super Structure Plan shall be super imposed on the Site Plan. The location of Bore holes and position of SPT/DCP Test shall be indicated in the Plan.
- iv) A Sketch showing the Elevations of the Ground Levels, Finished Levels, Proposed Plinth Level, proposed Foundation Level shall be attached. All levels shall be referred with respect to relevant GTS Bench Mark.
- v) Grain size distribution graphs shall be invariably attached.
- vi) Bore Log Charts for each Bore-hole showing the levels at which the samples were collected in the Format as shown in IS Code 1892-1979 shall be attached
- vii) Graphical presentation of SPT/DCP values for each Bore holes as prescribed in the relevant IS Code shall be attached.
- viii) Integrated graph showing the SPT Values for each Bore holes to give idea of Soil Profile/Subsoil Water Level to be plotted with common Datum with reference to GTS Mark.

6. DISCUSSION :-

The Consultant shall evaluate results in the manner deemed fit by him and he shall offer appropriate comments on the results identified and also technically explain the various variation in the results if any. The discussion shall include comments regarding :-

- i) Co-relation between the values of SPT and DCP Tests conducted at different depths.

contd....4

- ii) Co-relation between Field Value 'N' and the Laboratory Values of Density, Void Ratio, e , etc.,
- iii) Co-relation between Clay content and the value of C (Cohesion).
- iv) In case of the presence of the Clay content the anticipated effect on Structures shall be specifically discussed and mentioned. Any measures to contain adverse effects if any shall be spelt out.
- v) The anticipated effect if any with reference to salient features like Drain, Pond, filled up Soil, Rock, in the adjoining plot shall be discussed appropriately. The Field Engineer shall also obtain appropriate information of the Safe Bearing Capacity in the adjoining pocket if the same has been built up or is in the process of observation/development.

RECOMMENDATIONS :-

The proposed Multi-storeyed Buildings are anticipated to be 8 to 10 storeyes high Frame Structure. Tentative Load on each column is anticipated to be around 150 to 200 tones at Ground Floor level. The Service core area may be built up as Shear Walls if required

The Type of Foundation to be used shall be decided by the competent Authority after obtaining clarifications or any other relevant Data deemed necessary at appropriate time in consultation with the consultant. Considering above the consultant shall recommend the Safe, Stable and Economic Types of foundation. at the appropriate Depth both for columns in respect of Frame Structure and/or shear walls if provided in the Service Core area with reference to the Provisions of relevant IS Codes

- a) **Raft Foundation :-** In case the Raft Foundation is recommended the relevant calculations in accordance with the provisions of IS Code shall be attached.
- b) **Pile Foundation :-** In case the Pile Foundation is recommended the details as given below shall be part of the report.
- i) **Type of Piles Bored/Driven**

The type of the pile shall be specified with reference to IS 2911 Pt. I(Sec.1 to 4).

ii) Capacity of the Pile

The Capacity of the Pile shall be worked out according to the relevant IS Code. The recommendations shall include Mix, Length, Diameter, Reinforcement etc.

iii) The resistance for horizontal forces shall be worked out as per the relevant IS Code. The depth of fixity also shall be determined as per relevant IS Code.

iv) Effect of Negative Skin Friction if any shall be elaborated.

8. GENERAL :-

The nature and the Classification of the Cement to be used in the raft/Pile/Pile Caps/Grade Beams consistent with Soil Parameters shall be recommended.

The Consultant is free to conduct any other Field/Laboratory Test to determine and to include any other relevant vital information in his report to justify the Type of Foundation being recommended considering various existing Provisions of IS Code.

(M. L. TIKU)

SUPTDG. ENGINEER (DESIGN)

CE(D)/166

30/4/2001

70

OFFICE OF THE SUPTD. ENGINEER(D) I
CENTRAL DESIGNS ORGANISATION
DELHI DEVELOPMENT AUTHORITY

No. CE(D)/TC/13/84/DDA/281

Date: April 25, 2001

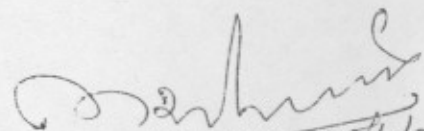
CIRCULAR - 22

IS: 456-2000 makes it mandatory that all Structures required to have fire resistance should be designed to possess an appropriate degree of resistance to Flame Penetration, heat transmission and failure. The fire resistance of a Structural Element is expressed in terms of time in hours in accordance with the IS-1641.

Central Design Office, DDA has decided with prior approval of Chief Engineer(Design) to adopt fire rating @1 hour for Load Bearing Buildings as well as RCC Structures being designed for DDA works according to Figure-I indicating minimum dimensions of Reinforced Concrete Members for fire resistance as available in IS : 456 - 2000 at page-34. The minimum size of Structural Members shall be adopted accordingly in the drawings to be issued by CDO according to the guidelines available in Figure-1 of IS: 456 -2000 as stated.

The fire rating is related to the fire escape to be provided appropriately by the Architect in the Unit Plan. The fire rating assumed @ 1 hour is to ensure that no distress is apparently visible during the first hour of fire. The fire rating is a relative term and may vary according to the utility of the structure. It shall be the responsibility of the Zonal Chief Engineer and Chief Architect, DDA to ensure that the fire rating assumed @1 hour is adequate. In case the Zonal Chief Engineer / Chief Architect feels it necessary to alter the fire rating beyond 1 hour for whatever reason it may be, it shall be the responsibility of the Zonal office to return the drawings to CDO so that revised drawings are prepared showing the change in the size of Members according to the guidance given in IS:456-2000. to meet necessary proposed fire rating either by Zonal Chief Engineer or the Chief Architect before the NIT is prepared.

In case deemed necessary, the Zonal Chief Engineer can indicate the fire rating to be assumed for preparation of Structural Design and also the Chief Architect is at liberty to indicate the fire rating if it is more than one hour in the Unit Plan proposed for the construction.


(M.L. TIKU) 25/4/20
Suptd. Engineer(D) I

Copy to:-

1. EM, DDA for kind information.
2. CE(D) for kind information.
3. Commissioner(Planning) DDA for kind information.
4. Chief Architect DDA for kind information.
5. All Chief Engineers DDA () with 30 spare copies for circulating among their SE's / EE's.
6. Suptd. Engineer(Vig.) I, II, III.
7. Suptd. Engineer(D) II.

(7)

OFFICE OF THE CHIEF ENGINEER(D)
CENTRAL DESIGNS ORGANISATION
DELHI DEVELOPMENT AUTHORITY

NO. CE(D)/T/C/13/84/DDA/313

Dt. 15-5-81

CIRCULAR-23

In a number of cases, it has been observed that Structural drgs./designs are being referred to CDO after the award of works. The basic purpose of making such a reference may be to get CDO's stamp of approval. The cases where modifications/corrections are required in the deficient structural arrangement adopted for preparation of estimate/NIT, there are bound to be delay in supplying revised designs or deviations in quantities or generation of Extra/substitute items etc. All these factors are associated with financial implications, which may lead to an audit objection at a later stage. Due to not referring structural designs at appropriate stage (Before calling of Tenders) CDO is made answerable for financial implications.

Therefore it is made clear to all, that no such case shall be entertained by CDO in future. It is further requested that, where a reference is to be made to CDO, the same should be done, well in advance of preparation of an estimate/NIT.

Sr
15/5/81
(Er. S.K. GARELLA)
CHIEF ENGINEER(DESIGNS)

Copy to:-

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7. Suptdg. Engineer(D) II.
8. All EE(D)s/CDO.

Sr
15/5/81
Chief Engineer(DESIGNS)

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DELHI DEVELOPMENT AUTHORITY
CENTRAL DESIGN ORGANISATION

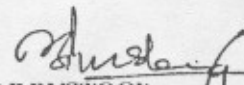
No. CE(D) TC/13/84/DDA/379

Dated: 18/9/03

CIRCULAR-20(REVISED 2003)

SUB: GENERAL INSTRUCTION FOR STRUCTURAL DESIGN.

Certain general instructions were issued by Chief Engineer(Design) vide Circular No.20(Revised 2001) dated 15.5.01. These instructions have been modified in view of revised IS 1893-2002, CPWD Specifications-2002 and are re-circulated through this office Circular No.20(Revised-2003). It is requested that these instructions may be circulated to all the Engineers working under your control.

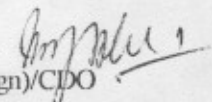

(S.P. RUSTOGI)
CHIEF ENGINEER(DESIGN) 17/9/2003

Encl: 4 sheets.

ALL CHIEF ENGINEERS/DDA

Copy alongwith enclosures forwarded to:-

1. All SEs.(Civil Circle-----)for further necessary action.
2. All Ex.Engineers(Design--CDO for information.


S.E.(Design)/CDO

CIRCULAR NO. 20 (REVISED 2003)

73

(A) GENERAL NOTES:-

1. Work shall be taken up only for the approved scheme.
2. All dimensions are in mm unless otherwise specified.
3. In case of any discrepancy in drawing or site conditions or Architectural drgs., the same shall be brought to the notice of Central Designs Organisation for reconciliation before execution.
4. No dimension shall be scaled out, only written dimensions shall be followed
5. All centre line dimensions shall be extracted from the Architectural Drawings.
6. If the area requires any filling, such filling would be kept to the minimum and plinth level would be decided accordingly. Filling of earth shall be done simultaneously for equal depths on both sides of the wall.
7. If it is a filled up area it should be ensured that the foundation rests within the original/virgin soil at a specific depth as recommended by the soil consultant.
8. It may be ensured by the Executive Engineer In-charge that houses/building under construction are situated sufficiently away from a retaining wall, nallah, well, ditch or low laying area, so as to ensure stability of soil / building. If necessary soil consultant/Central Designs Organisation should be consulted.
9. It must be ensured by EE In-charge that there existed no nallah water course at site which might have been filled up and may get activated leading to ingress of water below foundations and partial settlement thereof. Effective drainage arrangement shall be made for life time of the structure.
10. 115 mm thick walls and those above cantilever are to be non-load bearing, which will be constructed after de-shuttering the slab above, unless specified otherwise.
11. Projections provided for ornamental effect in elevation shall be suitably anchored back to the main structure.
12. Masonry where supported on cantilevers shall be firmly tied to main structure in accordance with IS-4326-1993.
- 13. Between adjoining footings at different levels, a clear horizontal distance shall be maintained so that slope of the joining line of footing beds is not steeper than 1 vertical : 2 horizontal. Where required suitable, drop in steps shall be provided in the foundation bed, maintaining a slope not steeper than 1 vertical : 2 horizontal for the cross wall also.
14. Design for compound/partition walls and plinth protection shall be finalised by the Executive Engineer In-charge.
15. Expansion /separation joints are to be provided as per codal requirements (IS-3414-1968/and IS-4326-1993 and IS 1893-2002).

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16. The drawings shall not be used for other work/works of similar nature except for the one issued for
 17. The thickness of concrete cover etc. proposed in the foundation, grade beams, raft, piles is based on the assumption that the soil / sub soil water is non-aggressive. Soil / sub soil water be got tested for harmful chemical. If these are present then necessary provisions be made as per relevant clauses of IS-2911 Part-III/1980 and IS 456-2000 before preparing NIT and shall also be brought into the notice of CDO immediately.
 18. The compound wall shall not be constructed alongwith the walls of the main building.
 19. In case during the excavation/piling work, the soil parameter are found different than that of given in Soil Investigation Report and subsequent clarification, it shall be immediately brought to the notice of CDO before further execution.
 20. 75 mm thick lean concrete shall be laid underneath foundation, Grade Beams, Mat, Raft and Pile cap wherever required.

(B) ADDITIONAL NOTES FOR LOAD BEARING MASONRY CONSTRUCTION

1. All the provisions of IS-1905-1987 shall be followed.
2. Cement mortar for foundation masonry with brick 75 designation shall be 1:6 (1 cement:6 fine sand) from foundation level to first off set below plinth.
3. Load bearing masonry wall are shown hatched in the plan.
4. No shuttering shall be provided for the column faces flushing 230 mm thick masonry walls. The walls shall be constructed prior to the casting of the columns, so as to provide proper bond between RCC and masonry.
5. Lintel bands shall be provided in all storeys as per IS-4326-1993.
6. Lintel bands reinforcement shall be continuous through column, lintels over openings and junctions of walls.
7. Suitable bed blocks shall be provided under the beams.
8. 230 mm thick load bearing brick work in cup board, provided in the rooms, will be stopped at lintel level for casting loft slab over it. Further brick work shall be continuous from foundation to the terrace level except R.C.C. slabs/lintels mentioned therein.
9. 200 mm thick lean concrete shall be provided under masonry wall sections unless specified otherwise.
10. There shall be no change in the position of load bearing walls from floor to floor unless specified otherwise.
11. Thickness of walls shall not be reduced for any fixture. In case such recession in masonry is necessary, reinforced cement concrete precast box of suitable shape shall be provided when brick work proceeds.
12. The masonry walls at expansion joint should be raised uniformly to avoid unequal loading

- (75)
13. Vertical reinforcement bars at corner & junctions of walls shall be provided at all floors as per IS-4326-1993 for four storeyed masonry buildings.

(C) ADDITIONAL NOTES FOR RCC WORK

1. All the provisions of IS-456-2000 shall be followed.
2. Unless noted otherwise, all Reinforced Cement Concrete works shall be done in M-25 design mix concrete as per CPWD specifications 2002 and IS 456-2000.
3. High yield strength deformed bars conforming to IS-1786-1985 (Grade Fe 415) shall be used. Testing shall be got done to ensure that TMT bars, in case used, conform to IS-1786-1985 and Modulus of Elasticity conform to IS 456-2000.
4. Generally not more than $1/3^{\text{rd}}$ of the steel reinforcement shall be lapped at one location.
5. The development length for reinforcement in tension, unless otherwise specified, shall be 40.3 times the bar diameter for the concrete grade M-25.
6. Nominal cover to all steel reinforcement including secondary reinforcement distribution & stirrups, unless shown otherwise in drawings, shall be as follows. (These are based on fire rating 1 hours-refer circular No.22/CDO).

Slabs	20mm
Terrace slabs, chajjas, fins	25mm
Beams (clear to stirrups)	30 mm
Columns / Piles (clear to stirrups)	40mm
Footings and all foundation members	50mm
Pile cap	60mm

7. Distribution reinforcement for suspended floor slabs, not shown; in the drawing, shall be provided as $8 \phi @ 300 \text{ c/c}$ for 100 mm thick RCC slabs.
8. Floor slabs, except otherwise specified, are 100mm thick. Reinforcement bending shall be done as per bar detailing schedule (SP-34(S&T)-1987).
9. For all beams, bearing shall be structurally stable/sound.
10. Depressions in slabs wherever indicated are the maximum permissible. These may be reduced as per site requirements.
11. Bearing for the slab shall be for full brick width of the wall/beam.
12. Ductility reinforcement detailing, for earthquake resistant designs, shall be provided as per IS13920-1993.
13. Height of the columns pedestal (including depth of the footing) shall be not less than $32.2 \times$ largest dia. of the column bar in M-25 grade.
14. Clear height of the pedestal shall not exceed three times the smaller lateral dimension of the pedestal.

(76)

15. Suitable camber shall be provided for the large spanned and cantilever members as per relevant CPWD specifications. Centering for the cantilevers shall be removed only after adequate counter weight is available.

16. Side face reinforcement shall be provided for beams where depth of the web is more than 750mm.

17. Additional reinforcement be provided around cutouts/opening as per fig. 9.10 & 9.11 (Page-130) of SP 34 (S&T) 1987.

18. The stirrups in beams/columns shall be closed one having a 135° hooks with a 10d or 75mm,

whichever is greater, extensions at each end.

(D) PILES

1. The pile drawing is applicable for preparation of estimate and subject to clearance of initial load test results by the Engineer-in-charge.

2. a) The minimum spacing of piles of uniform shaft shall be three times the shaft dia. of the piles unless specified otherwise.

b) The center to center spacing for bored cast in situ under reamed piles in a group should be two times the bulb dia (D_u). It shall not be less than $1.5 D_u$

3. The maximum spacing of piles shall not exceed 3 meter.

4. For the execution and testing of pile foundation, all the relevant clauses of IS Code 2911 (Part-I to IV) with upto date amendments shall be followed.

5. The piles shall project 50mm into the cap/Grade beam/raft.

6. The reinforcement from the pile shall be properly anchored into the Grade beam/raft as per drawing.

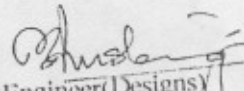
7. Filling wherever required shall be done as per specifications, prior to taking up of the pile work.

8. Length of piles specified in the drawing are from the virgin soil only. [Refer Bore Hole logs in Soil Investigation report for level of virgin soil.] Additional length, over and above the design length, shall be provided for the piles, equal to the filled up depth.

9. The routine test shall be carried out as per IS 2911 Part-IV 1985.

10. For intermediate piles wherever distances are not specified, shall be treated as centrally located.

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Chief Engineer (Designs) 17/9/2023
C.D.O/DDA

OFFICE OF THE CHIEF ENGINEER (DESIGN)
CENTRAL DESIGN ORGANISATION

F 21/SE(D)IV/Misc(Tech)/CDO/03/58

Dt. 28.7.2004

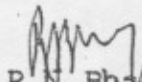
CIRCULAR

Subject: Reinforcement detailing for RCC Members
as per ductility requirement of IS:13920:1993

During inspection of Housing Projects, it was observed by Engineer Member that provision of overlaps in reinforcement is not being provided properly for RCC Members.

Normally, bar bending details are incorporated in Structural drawings being issued by CDO. These details have been further elaborated in the diagrams enclosed, so as to ensure precise location of overlaps, cranking slope alongwith stirrups details.


All the Chief Engineers are requested to ensure that these details are followed meticulously in case of RCC framed construction.


(R.N. Bhagi)
Chief Engineer (Design)

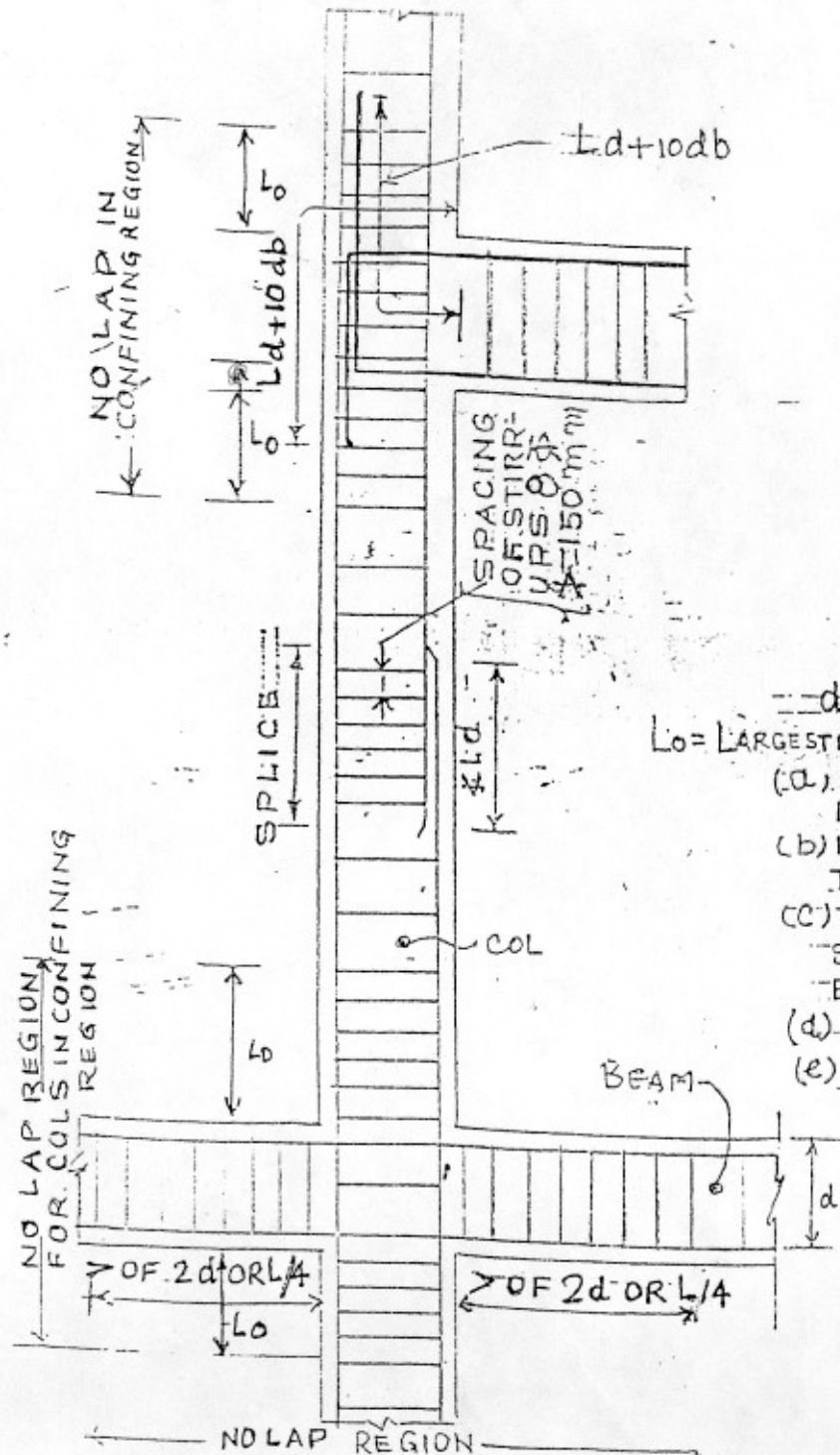
Chief Engineer- Rohini/Dwarka/East Zone/
South-east Zone/South-west Zone/North Zone

For INFORMATION/Necessary Action

1. CE(QC)/DDA.
2. CE(HR)/DDA.
3. SE(D)I/SE(D)II/EE(D)I/EE(D)II/EE(D)III/EE(D)IV/EE(D)V/EE(D)VI (CDO.)


SE(D)IV/CDO.

-1/2



$d_b = \text{DIA OF THE BAR}$

$L_0 = \text{LARGEST OF THE FOLLOWINGS}$

- (a) LARGER LATERAL DIMENSION OF THE COL.
- (b) $1/6$ OF CLEAR SPAN OF THE COLUMN
- (c) 450 MM

SPACING OF STIRRUPS SHALL BE AS PER STRUCTURAL DRAWING

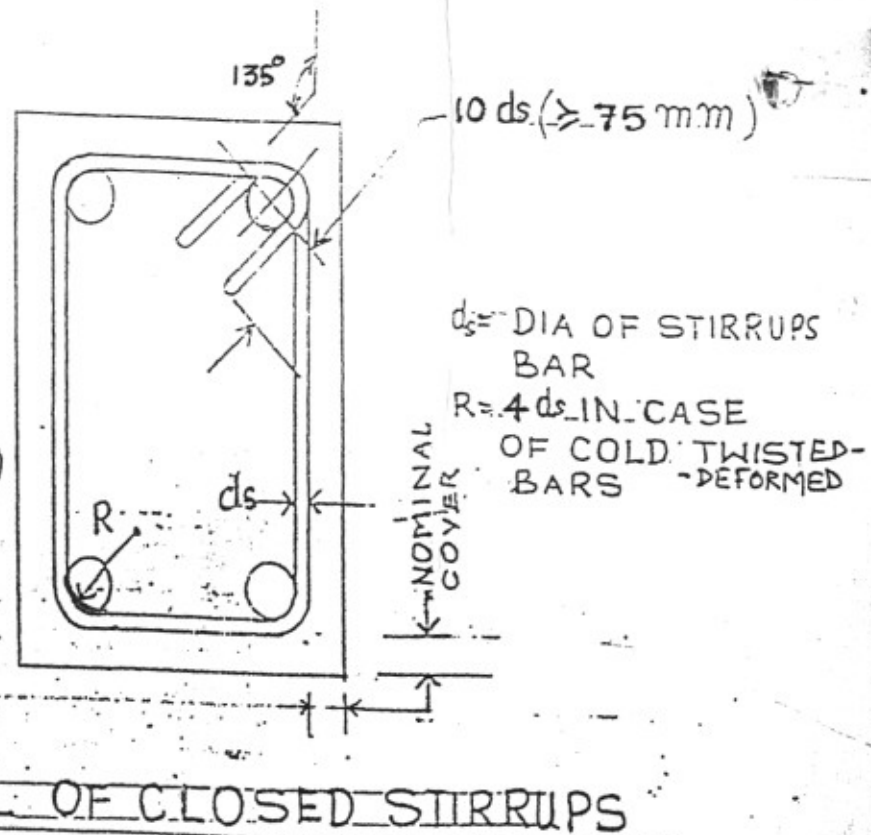
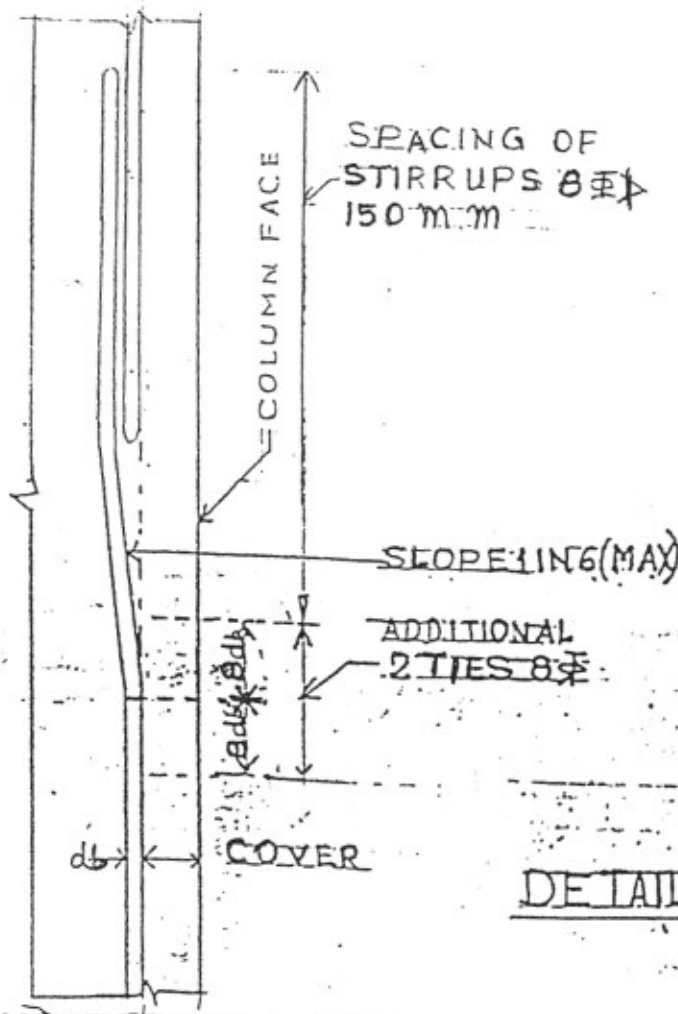
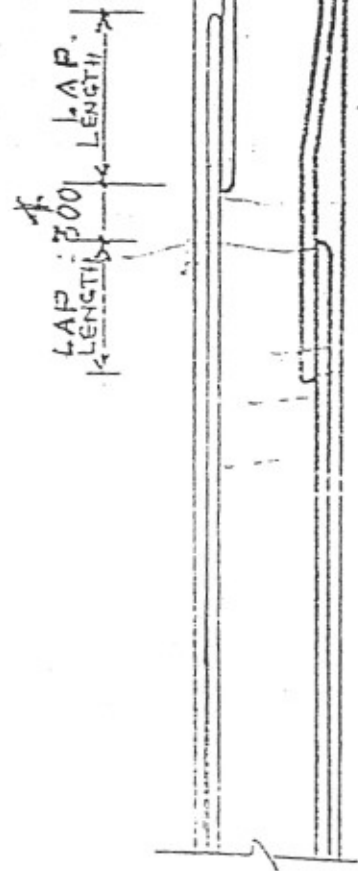
(d) $L_d = \text{DEVELOPMENT LENGTH IN TENSION}$

(e) SPACING OF STIRRUPS IN SPLICE PORTION FOR COLS. & BEAMS SHALL BE $\geq 150 \text{ mm}$

$L = \text{CLEAR SPAN OF THE BEAM}$

DETAILING OF SPLICES IN BEAMS AND COLUMNS

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NOTES:-

1. NOT MORE THAN ONE THIRD OF THE BARS SHALL BE SPLICED AT ONE LOCATION. (RESTRICTED TO MAX. 50%)
2. IN CASE OF SECONDARY/SIMPLY SUPPORTED BEAMS LAP SHALL NOT BE PROVIDED IN THE MIDDLE ONE THIRD OF SPAN
3. WHEN BARS OF TWO DIFFERENT DIAMETER ARE TO BE SPLICED, THE LAP LENGTH SHALL BE CALCULATED ON THE BASIS OF DIAMETER OF SMALL BARS
4. LAP LENGTH FOR CONCRETE MIX M25 = $40.3 \times \text{DIA. OF BAR}$