

1. GENERAL NOTES:-

- 1.1 THESE NOTES SHALL BE APPLICABLE TO ALL THE STRUCTURAL DRAWINGS THROUGHOUT THE PROJECT.
- 1.2 THESE NOTES AND STRUCTURAL DRAWINGS SHALL NOT BE USED FOR ANY PURPOSE/ PROJECT OTHER THAN SPECIFIED, WITHOUT PRIOR WRITTEN PERMISSION OF THE COMPETENT AUTHORITY.
- 1.3 ALL DRAWINGS OF ARCHITECTURAL, STRUCTURAL, ELECTRICAL, SANITARY, PLUMBING ETC., FORMING PART OF THE CONTRACT SHALL BE READ IN CONJUNCTION WITH EACH OTHER.
- 1.4 ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH RELEVANT INDIAN STANDARDS AND OTHER CONTRACT CONDITIONS & PROVISIONS. THE CONTRACTOR AND EXECUTIVES SHALL CAREFULLY CHECK IN ADVANCE ALL THE DRAWINGS PRIOR TO COMMENCEMENT OF THE WORK. IN CASE ANY DISCREPANCY/ AMBIGUITY OBSERVED, THE SAME SHALL BE BROUGHT TO THE NOTICE OF THE COMPETENT AUTHORITY FOR DECISIONS/ CLARIFICATIONS.
- 1.5 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- 1.6 NO DIMENSIONS SHALL BE SCALED FROM STRUCTURAL DRAWINGS. ONLY FIGURED DIMENSIONS SHALL BE FOLLOWED. ANY MISSING DETAILS/ DISCREPANCY SHALL BE BROUGHT TO THE NOTICE OF THE COMPETENT AUTHORITY FOR CLARIFICATIONS. THE CONTRACTOR AND EXECUTIVES SHALL CHECK AND VERIFY ALL THE DIMENSIONS BEFORE EXECUTION OF THE WORK.
- 1.7 IN CASE OF DISCREPANCY/ AMBIGUITY IN DETAILS GIVEN IN STRUCTURAL DRAWINGS AND ARCHITECTURAL DRAWINGS/ TO DRAWINGS/ SERVICES DRAWINGS (ELECTRICAL, SANITARY, PLUMBING ETC.), THE DETAILS GIVEN IN STRUCTURAL DRAWINGS SHALL SUPERSEDE.
- 1.8 THE RELEVANT INDIAN STANDARDS WHEREVER REFERRED/ APPLICABLE TO THE PROJECT SHALL BE THE LATEST EDITIONS OF IS CODES AND SPECIAL PUBLICATIONS, NATIONAL BUILDING CODE, IRC CODES AND PUBLICATIONS ETC., WITH ALL ERRATA AND AMENDMENTS AS ON THE DATE OF ISSUE OF THE CONTRACT.
- 1.9 NO EXCAVATIONS/BORINGS/ FILLINGS IN THE CLOSE VICINITY OF STRUCTURE, STRUCTURAL ALTERATIONS OR CHANGE IN LOADING CONDITIONS ON STRUCTURE WHICH MAY AFFECT THE DESIGN OF STRUCTURE, SHALL BE CARRIED OUT WITHOUT PRIOR WRITTEN PERMISSION OF THE COMPETENT AUTHORITY.
- 2.0 DEVELOPMENT LENGTH ( $L_d$ ) FOR REINFORCEMENT BAR SHALL BE EQUAL TO 46 TIMES THE DIA OF BAR FOR ALL STRUCTURAL MEMBERS
- 2.0A FOR CRUMPLE JOINTS REFER. DRG. NO: CEVZ/2022/WD-2120(S) SHT. NO. 35R140
2. MATERIALS AND WORKMANSHIP:-
- 2.1 ALL THE MATERIALS USED IN CONSTRUCTION SUCH AS CEMENT, REINFORCEMENT STEEL, COARSE AGGREGATE, FINE AGGREGATE, WATER, CHEMICALS & ADMIXTURES, STRUCTURAL STEEL, BRICKS ETC., SHALL BE OF GOOD QUALITY & CONFORMING TO RELEVANT INDIAN STANDARDS. ALL NECESSARY TESTING OF MATERIALS SHALL BE CONDUCTED AS SPECIFIED IN CONTRACT AGREEMENT AND RELEVANT INDIAN STANDARDS BEFORE INCORPORATION OF THE MATERIAL AND DURING EXECUTION.
3. CEMENT:-
- 3.1 THE TYPE OF CEMENT FOR ALL RCC/PCC/OTHER BUILDING WORKS SHALL BE AS SPECIFIED IN CONTRACT/DRAWINGS AND SHALL CONFIRM TO RELEVANT INDIAN STANDARDS AS UNDER
- (a) 43 GRADE ORDINARY PORTLAND CEMENT CONFORMING TO IS-269-2015 SHALL BE USED FOR RCC WORK AND PILE FOUNDATION
- (b) PPC CONFIRMING TO IS 1489 PART-1, OR PSC CONFIRMING TO IS-455 SHALL BE USED FOR OTHER THAN RCC WORK i.e. PCC, MASONARY, PLASTERING, SCREED ETC.
- 3.2 TESTS FOR COMPRESSIVE STRENGTH, INITIAL SETTING TIME, FINAL SETTING TIME, SOUNDNESS, FINENESS ETC., SHALL BE CONDUCTED FOR THE CEMENT AS PER IS-4031. THE CEMENT SHALL BE TESTED AT AN INTERVAL OF NOT EXCEEDING THREE MONTHS OR WHENEVER THERE IS CHANGE IN SOURCE OF CEMENT. ALL TEST RESULTS SHALL BE TREATED AS EXPIRED AFTER A LAPSE OF THREE MONTHS FROM THE DATE OF TEST.
- 4.0 WATER:-
- 4.1 WATER USED IN CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF CLAUSE 5.4 OF IS-456.
- 4.2 POTABLE WATER IS GENERALLY CONSIDERED SATISFACTORY FOR MAKING OF CONCRETE. THE pH-VALUE OF WATER SHALL BE GENERALLY NOT LESS THAN 6.
- 4.3 SOURCES OF WATER SHALL BE TESTED FOR ITS SUITABILITY.
- 4.4 SUITABILITY OF WATER FOR MANUFACTURING CONCRETE AND CURING ETC., SHALL BE APPROVED BY THE ENGINEER-IN-CHARGE BEFORE COMMENCEMENT OF WORK AT WORK SITE AND LATER WHENEVER THERE IS A CHANGE IN THE SOURCE OF WATER USED.
- 5.0 AGGREGATES:-
- 5.1 COARSE AGGREGATE SHALL BE FROM NATURAL SOURCE AND SHALL CONSIST OF CRUSHED STONE CONFORMING TO IS-383.
- 5.2 THE NOMINAL MAXIMUM SIZE OF COARSE AGGREGATE SHALL BE GREATER THAN ONE FOURTH OF THE MINIMUM DIMENSION OF THE MEMBER UNLESS OTHERWISE SPECIFIED. FOR REINFORCED CONCRETE MEMBERS OF THICKNESS MORE THAN 80MM, 20MM NOMINAL SIZED AGGREGATE MAY BE USED.

- 5.3 FINE AGGREGATE SHALL BE NATURAL RIVER SAND CONFORMING TO IS-383. THE GRADING ZONE SHALL BE 2 FOR ALL WORKS EXCEPT IN PLASTERING WORKS.

6.0 ADMIXTURES:-

- 6.1 ADMIXTURES USED IN CONCRETE SHALL COMPLY WITH THE REQUIREMENTS OF CLAUSE 5.2 & 5.5 OF IS-456.
- 6.2 THE QUANTITY OF POZZOLANA AND SLAG SHALL NOT EXCEED THE LIMITS SPECIFIED IN IS-489(PART-1) AND IS-455 RESPECTIVELY.

7.0 REINFORCEMENT AND DETAILING:-

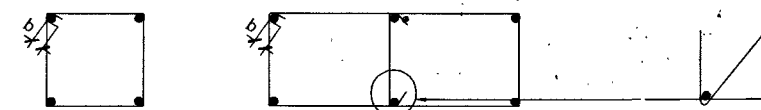
- 7.1 ALL REINFORCEMENT FABRICATION AND ASSEMBLY IN RCC WORKS SHALL BE CORRECTLY DONE AS PER DETAILS GIVEN IN THE STRUCTURAL DRAWINGS. IT SHALL BE FABRICATED IN CONFORMITY WITH IS -2502 & IS-5525 AND CLAUSE 12 OF IS-456.
- 7.2 ALL REINFORCEMENT BEFORE PLACEMENT AND ASSEMBLY SHALL BE MADE FREE FROM LOOSE MILL SCALES, RUST, COATS OF PAINTS, OIL, MUD OR ANY OTHER SUBSTANCE WHICH MAY DESTROY OR REDUCE BOND. SAND BLASTING OR OTHER TREATMENT IS RECOMMENDED TO CLEAN THE REINFORCEMENT.
- 7.3 A RE-BAR ONCE BENT, HOOKED OR CRANKED SHALL NOT BE STRAIGHTENED AND USED AGAIN.
- 7.4 BAR BENDING SCHEDULE SHALL BE PREPARED FOR ALL REINFORCEMENT WORKS PLACING OF THE REINFORCEMENT.
- 7.5 REINFORCEMENT DETAILING SHALL BE DONE IN ACCORDANCE WITH IS-456 AND SP-34 OF INDIAN STANDARDS EXCEPT AS MODIFIED BY THE PROVISIONS OF IS-13920 FOR SEISMIC ZONES-III, IV & V. (REFER STRUCTURAL STANDARD DRAWING. CE(V)/DU/02-21/TYD/01, SHT.2&3).
- 7.6 IT SHALL BE ENSURED THAT WHILE CONCRETING, THE BARS ARE NOT DISPLACED OR DISTURBED FROM POSITION DUE TO MOVEMENT OF WORKERS/EQUIPMENT ETC. ADEQUATE TEMPORARY WORKING PLATFORM SHALL BE PROVIDED FOR WORKERS/ EQUIPMENT. SPECIAL CARE SHALL BE TAKEN IN CASE OF CANTILEVER BEAMS AND SLABS.

8. NOMINAL COVER:-

- 8.1 ADEQUATE COVER SHALL BE MAINTAINED FOR ALL RCC MEMBERS BY ATTACHING SUITABLE COVER BLOCKS TO RE-BARS. THE NOMINAL COVER (MINIMUM CLEAR COVER) FOR ALL RE-BARS INCLUDING STIRRUPS/TIES FOR DIFFERENT MEMBERS SHALL BE AS FOLLOWS:

| CLEAR COVER FOR STRUCTURAL ELEMENTS | BOTTOM | SIDES | TOP  |
|-------------------------------------|--------|-------|------|
| a) PILE                             | 100 MM | 60 MM | -    |
| b) PILE CAP                         | 75 MM  | 75 MM | 75MM |
| c) COLUMN & SHEAR WALL              | -      | 45 MM | -    |
| d) SHEAR WALL UPTO 200 MM WIDTH     | -      | 30 MM | -    |
| e) BEAM                             | 40 MM  | 40 MM | 40MM |
| f) SLAB                             | 30 MM  | 30 MM | 30MM |
| g) LINTEL & STAIRS                  | 30 MM  | 30 MM | 30MM |

- 8.2 THE STIRRUPS, TIES AND LINKS IN ALL BEAMS AND COLUMNS SHALL BE PROVIDED AS FOLLOWS:



BENT LENGTH  $b = 8$  TIMES  $D$  OR 75 MM (WHICHEVER IS LARGER) WHERE  $D$  = BAR DIA OF STIRRUPS, TIES & LINKS.

9.0 JOINTS/SPICES:-

- 9.1 LAP SPICES SHALL NOT BE USED FOR BARS LARGER THAN 36MM DIA. FOR LARGER DIAMETERS, BARS MAY BE WELDED. IN CASE WHERE WELDING IS NOT PRACTICABLE OF BAR LARGER THAN 36 MM MAY BE PERMITTED IN WHICH ADDITIONAL SPIRALS SHALL BE PROVIDED AROUND THE LAPPED BAR.
- 9.2 THE DEVELOPMENT LENGTH FOR FE 500 STEEL AND M30 CONCRETE SHALL BE 46 TIMES DIA OF BAR IRRESPECTIVE OF POSITION OF THE BAR i.e., IN COMPRESSION/TENSION. FOR ANY OTHER COMBINATION, DEVELOPMENT LENGTH AS SPECIFIED IN CLAUSE NO-26.2.1 OF IS 456:2000 SHALL BE FOLLOWED.

10.0 PLACING:-

- 10.1 UNLESS OTHERWISE SPECIFIED THE REINFORCEMENT SHALL BE PLACED WITHIN FOLLOWING TOLERANCES :- FOR EFFECTIVE DEPTH UP TO 200MM  $\pm 10$  MM. FOR EFFECTIVE DEPTH MORE THAN 200MM  $\pm 15$  MM.

- 10.2 TO MAINTAIN SPECIFIED NOMINAL COVER TO STEEL REINFORCEMENT SPACER/ COVER BLOCK OF PVC OR CONCRETE OF SAME STRENGTH SHALL BE USED. SPACER/COVER SHALL BE LACED AT A MAXIMUM SPACING OF 01 (ONE) METER.
- 10.3 CHAIRS OF 12 DIA SHALL BE PROVIDED IN SLAB @ 1 NO. /1 SQM TO SUPPORT TOP REINFORCEMENT

- 10.4 SPACER BARS OF 25 DIA SHALL BE PROVIDED IN BEAMS WHEREVER REINFORCEMENT IS PROVIDED TWO LAYERS

11.0 FORM WORK:-

- 11.1 STRIPPING TIME SHALL BE IN ACCORDANCE WITH CLAUSE 11.3 OF IS 456-2000 AND MAY BE MODIFIED BY GE, DEPENDING UPON THE SITE CONDITIONS, WEATHER & TYPE OF CEMENT, ETC. IN GENERAL WHERE AMBIENT TEMPERATURE DOES NOT FALL BELOW 15° AND WHERE ORDINARY PORTLAND CEMENT IS USED AND ADEQUATE CURING IS DONE, THE FOLLOWING MINIMUM PERIOD FOR STRIPPING/STRIKING FORMWORK MAY BE FOLLOWED.

| TYPES OF FORM WORK  | MINIMUM PERIOD BEFORE STRIKING FORMWORK |
|---|---|
| A) VERTICAL FORMWORK TO COLUMNS WALLS, BEAMS  | 16-24 H                                 |
| B) SOFFIT FORMWORK TO SLABS (PROPS TO BE REFIXED IMMEDIATELY AFTER REMOVAL OF FORMWORK) | 3 DAYS                                  |
| C) SOFFIT FORMWORK TO BEAMS (PROPS TO BE REFIXED IMMEDIATELY AFTER REMOVAL OF FORMWORK) | 7 DAYS                                  |
| D) PROPS TO SLABS:<br>1) SPANNING UP TO 4.5 M<br>2) SPANNING OVER 4.5 M                 | 7 DAYS<br>14 DAYS                       |
| E) PROPS TO BEAMS & ARCHES:<br>1) SPANNING UP TO 6 M<br>2) SPANNING OVER 6 M            | 14 DAYS<br>21 DAYS                      |

- 11.2 PROPS OF CANTILEVER SLAB / BEAM SHALL BE REMOVED ONLY AFTER THE WALL OVER THE BEAM / COUNTER WEIGHT HAS BEEN CONSTRUCTED.

- 11.3 IN CASE OF CANTILEVER BEAM/SLAB, THE FORMWORK SHALL BE REMOVED FROM FREE END SIDE ONLY.

12.0 MAXIMUM CEMENT CONTENT:-

- 12.1 OTHER REQUIREMENTS FOR DURABILITY SHALL BE ENSURED IN ACCORDANCE WITH CLAUSE 8.2 OF IS-456.

13. PLACING AND COMPACTION - PLACING

- 13.1 THE SCHEME OF CONCRETE PLACING SHALL BE APPROVED BY THE GE. IT SHALL BE ENSURED THAT DURING CONCRETING THERE IS NO SEGREGATION OF ITS CONSTITUENTS.

- 13.2 AS FAR AS POSSIBLE ALL CONCRETING SHALL BE DONE IN ONE OPERATION UP TO THE PRE-DECIDED STAGE AS PER CLAUSE 13.4 OF IS-456. CONCRETE ONCE PLACED AND COMPACTED SHALL NOT BE DISTURBED OR REMOULDED.

- 13.3 IN CASE OF BEAMS, CONCRETE SHALL BE PLACED STARTING FROM SUPPORTS AND CONTINUED TOWARDS MID SPAN.

- 13.4 IN CASE OF CANTILEVERS, CONCRETE SHALL BE LACED STARTING AT THE FIXED END, MOVING TOWARDS FREE END.

- 13.5 THE VERTICAL LIFT FOR RCC WALLS AND RIBS OF DEEP BEAMS SHALL NOT BE MORE THAN 900 MM AND THAT FOR COLUMNS 1200 MM. THE HEIGHT OF FORM WORK AT THE POURING FACE SHALL BE RESTRICTED TO AVOID SEGREGATION OF CONCRETE DURING POURING AND FOR EASE OF COMPACTION.

- 13.6 ANY PIPE, DUCT OR ANY OTHER FIXTURE OR TAKEN THROUGH A RCC/PCC MEMBER SHALL BE INITIALLY PLACED IN POSITION OR NECESSARY PROVISIONS FOR THE SAME SHALL BE MORE BEFORE CONCRETING. CONCRETE ONCE CAST AND HARDENED SHALL NOT BE BROKEN/DAMAGED/REMOULDED TO PROVIDE OPENINGS FOR PIPES OR OTHER FIXTURES ETC.

- 13.7 IN CASE ADJOINING MEMBER IS HAVING DIFFERENT GRADE OF CONCRETE, THE RICHER CONCRETE SHALL BE PLACED AND COMPACTED FIRST BY CONTAINING THE CONCRETE WITH THE HELP OF STOP BOARDS.

14.0 PLACING AND COMPACTION:- COMPACTION

- 14.1 ALL CONCRETE FOR RCC WORK SHALL BE COMPACTED USING APPROPRIATE TYPE OF VIBRATORS, SO AS TO ACHIEVE DENSE AND COMPACT CONCRETE AROUND REINFORCEMENT OR ANY EMBEDDED FIXTURE AND TO THE SIDE OF FORM WORK. VIBRATORS FOR COMPACTION OF CONCRETE SHALL COMPLY WITH THE REQUIREMENTS IF IS-2506, IS-2508, IS-2514 AND IS-4656.

- 14.2 OVER VIBRATION MAY LEAD TO SEGREGATION OF CONCRETE AND UNDER VIBRATION MAY NOT GIVE THE NECESSARY COMPACTION AND THEREFORE SHALL BE AVOIDED. PROPER VIBRATION TO ACHIEVE A DENSE AND VOID FREE CONCRETE SHALL BE ENSURED.

- 14.3 VIBRATORS SHALL NOT BE USED TO SHIFT THE CONCRETE MASS, AS IT SHALL RESULT IN SEGREGATION. CONCRETE ONCE LAID AND COMACTED SHALL NOT BE DISTURBED OR REMOULDED.

|           |                     |      |
|-----------|---------------------|------|
| 03-03-23  | NOTE 2.0A CORRECTED | M    |
| 03-03-23  | NOTE 3.2 CORRECTED  | B    |
| DATE      | DESCRIPTION         | SIGN |
| REVISIONS |                     |      |

VETTED BY

ALL DETAILS HAVE BEEN THOROUGHLY CHECKED AND ARE IN COMPLIANCE TO STANDARDS, CODES, REGULATIONS IN RESPECT OF SAFETY, SOUNDNESS AND ECONOMY.

*S. Surya*

PROVN OF HANGAR AND ANNEXE  
BUILDING AT  
INS DEGA VISAKHAPATNAM

GENERAL NOTES-1

|         |            |  |
|---------|------------|--|
| SHT NO. | S01        | <b>HELIOS ENGINEERING CONSULTANTS</b><br>#38-34-66 FCI COLONY<br>MARRIAPALEM<br>VISAKHAPATNAM - 530018 |
| PRO NO. | ST204      |  |
| SCALE.  | AS NOTED   |  |
| DRN BY. | KSS        |  |
| DATE.   | 28-02-2023 |  |

|   |   |
|---|---|
| DESIGNED BY<br><i>D. V. Trinadh Rao</i><br>DV TRINADH RAO | CHECKED BY<br><i>S. Surya</i><br>S SURYA<br>MS (STRUCTURES) |
|---|---|

**CHIEF ENGINEER  
(NAVY)  
VISAKHAPATNAM**

REF.DRG. NO : CEVZ/2022/WD-2120(S) (GN) Sht.No.14/4

DESIGNS & DRAWINGS PREPARED UNDER CONSULTANCY FROM M/S HELIOS ENGINEERING CONSULTANTS AND VETTED BY ANDHRA UNIVERSITY

*K. Ramesh*  
K. Ramesh  
Lt Col  
SO 1 (Design)  
for Chief Engineer

*Srinivas Nalla*  
Srinivas Nalla, ISE  
CE (NF)  
Director (Design)  
for Chief Engineer