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THE PROPOSED RESIDENTIAL BUILDING STILT + 5 FLOORS WITH 9 DWELLING UNITS (18.30M HEIGHT) AT OLD DOOR NO: 5, NEW DOOR NO: 13, NAGESWARA RAO ROAD, NUNGAMBAKKAM, CHENNAI – 600 034, COMPRISED IN R.S.NO: 142/4, BLOCK NO: 21, NUNGAMBAKKAM VILLAGE, EGMORE TALUK, CHENNAI DISTRICT. WITH IN THE LIMIT OF GREATER CHENNAI CORPORATION ZONE: XIV, DIVISION 183.

GENERAL NOTE ON STRUCTURAL DESIGN

1.0 GENERAL

1.1 DESIGN BASIS

The design of this building is carried out based on frame analysis using STAAD Pro V8i.

1.2 CODES AND STANDARDS

All structural design is carried out conforming to the provisions in National Building Code of India and other relevant Indian Codes and Standards.

1. I.S. 456
2. I.S. 875 - Part I to V
3. I.S.1893
4. I.S.13920
5. I.S.800

2.0 BASIC CIVIL DESIGN LOADS

2.0 DEAD LOADS & LIVE LOADS

Typical slab dead load is calculated as follows

Residential Building

Self-weight of slab	=	2.0kN/m²
Floor finish	=	2.0kN/m²
Live load	=	3.0kN/m²
		7.0kN/m²

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REG No. RSE100392019

3.0 SOIL DETAILS

Based on Soil Test Report Pile Foundation is adopted.

4.0 DESIGN METHODS

General design and detailing of concrete members/elements are done conforming to the provisions of I.S: 456 and other relevant I.S codes. Limit State method is followed for the design.

Seismic Zone III load is taken into account for the analysis. The predominant direction of vibration is horizontal. Relevant combination of forces has been taken into account.

4.1

Load Combination	Ultimate Limit Load	Serviceability Limit State
DL+LL+WL Or DL+LL+EL	1.2DL+1.2LL+1.2WL Or 1.2DL+1.2LL+1.2EL	DL+LL+WL Or DL+LL+EL

-

4.2.1 MINIMUM COVER

Slab	20 mm
Beam	25 mm
Columns	40 mm
Foundations	50 mm

Structure will be sound and stable when used for the purpose for which it is designed.

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REG No. RSE100392019

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**************************************************
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*          STAAD.Pro CONNECT Edition             *
*          Version  22.12.00.142                 *
*          Proprietary Program of                *
*          Bentley Systems, Inc.                 *
*          Date=    DEC 19, 2023                 *
*          Time=    12: 4:35                     *
*                                                *
*  Licensed to: United Consultanta               *
**************************************************
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     1. STAAD SPACE THE PROPOSED RESIDENTIAL BUILDING STILT + 5 FLOORS AT -
     2. *NUNGAMBAKKAM CHENNAI
     3. START JOB INFORMATION
     4. ENGINEER DATE 19-DEC-23
     5. JOB NAME THE PROPOSED RESIDENTIAL BUILDING STILT + 5 FLOORS WITH 9 DWELLING -
     6. UNITS (18.30M HEIGHT) AT OLD DOOR NO: 5, NEW DOOR NO: 13, NAGESWARA RAO -
     7. ROAD, NUNGAMBAKKAM, CHENNAI - 600 034, COMPRISED IN R.S.NO: 142/4, BLOCK NO: -
     8. 21, NUNGAMBAKKAM VILLAGE, EGMORE TALUK, CHENNAI DISTRICT. WITH IN THE LIMIT -
     9. OF GREATER CHENNAI CORPORATION ZONE: XIV, DIVISION 183
    10. ENGINEER NAME ABISHEK T
    11. CHECKER NAME ALEX JACOB
    12. APPROVED NAME ALEX JACOB
    13. CHECKER DATE 12/19/2023
    14. APPROVED DATE 12/19/2023
    15. END JOB INFORMATION
    16. INPUT WIDTH 79
    17. UNIT METER KN
    18. JOINT COORDINATES
    19. 1 0 0 0; 2 4.335 0 0; 3 9.89 0 0; 4 14.134 0 0; 5 0 3.05 0; 6 4.335 3.05 0
    20. 7 9.89 3.05 0; 8 14.134 3.05 0; 9 0 6.1 0; 10 4.335 6.1 0; 11 9.89 6.1 0
    21. 12 14.134 6.1 0; 13 0 9.15 0; 14 4.335 9.15 0; 15 9.89 9.15 0
    22. 16 14.134 9.15 0; 17 0 12.2 0; 18 4.335 12.2 0; 19 9.89 12.2 0
    23. 20 14.134 12.2 0; 21 0 15.25 0; 22 4.335 15.25 0; 23 9.89 15.25 0
    24. 24 14.134 15.25 0; 25 0 18.3 0; 26 4.335 18.3 0; 27 9.89 18.3 0
    25. 28 14.134 18.3 0
    26. MEMBER INCIDENCES
    27. 4 1 5; 5 2 6; 6 3 7; 7 4 8; 8 5 6; 9 6 7; 10 7 8; 11 5 9; 12 6 10; 13 7 11
    28. 14 8 12; 15 9 10; 16 10 11; 17 11 12; 18 9 13; 19 10 14; 20 11 15; 21 12 16
    29. 22 13 14; 23 14 15; 24 15 16; 25 13 17; 26 14 18; 27 15 19; 28 16 20; 29 17 18
    30. 30 18 19; 31 19 20; 32 17 21; 33 18 22; 34 19 23; 35 20 24; 36 21 22; 37 22 23
    31. 38 23 24; 39 21 25; 40 22 26; 41 23 27; 42 24 28; 43 25 26; 44 26 27; 45 27 28
    32. DEFINE MATERIAL START
    33. ISOTROPIC CONCRETE
    34. E 2.17185E+07
    35. POISSON 0.17
    36. DENSITY 23.5616
    37. ALPHA 1E-05
    38. DAMP 0.05
```

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REG No. TSE100392019

THE PROPOSED RESIDENTIAL BUILDING STILT + 5 FLOORS AT - -- PAGE NO. 2

```
39. G 9.28139E+06
40. TYPE CONCRETE
41. STRENGTH FCU 27579
42. END DEFINE MATERIAL
43. MEMBER PROPERTY
44. 4 TO 7 11 TO 14 18 TO 21 25 TO 28 32 TO 35 39 TO 42 PRIS YD 0.6 ZD 0.2
45. 8 TO 10 15 TO 17 22 TO 24 29 TO 31 36 TO 38 43 TO 45 PRIS YD 0.6 ZD 0.2
46. CONSTANTS
47. MATERIAL CONCRETE ALL
48. SUPPORTS
49. 1 TO 4 FIXED
50. DEFINE WIND LOAD

*** NOTE: If any floor diaphragm is present in the model Wind Load definition
          should be defined after Floor Diaphragm definition. Otherwise wind
          load generation may be unsuccessful during analysis.

51. TYPE 1 WIND 1
52. <! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
53. IS875-2015:PARAMS 0 0 0 0.000 0.000 5.000 0 50.000 0 1.000 0 0 1.000 2 1.000 -
54. 1.000 0 0.000 0.000 0.000 0 0 0 1.000 0 0 0.200 1.000 0 1.000 1.000 1.000
55. !> END GENERATED DATA BLOCK
56. INT 0.91 0.91 0.97 0.996 HEIG  5  10  15  18.3
57. DEFINE IS1893 2016 LOAD
58. ZONE 0.16 RF 3 I 1.2 SS 3 ST 2 DM 0.05 PX 0.66 PZ 0.66
59. SELFWEIGHT -1
60. MEMBER WEIGHT
61. 8 TO 10 15 TO 17 22 TO 24 29 TO 31 36 TO 38 43 TO 45 UNI -9.8 0 0
62. 10 17 24 31 38 45 UNI -7.2 0 0
63. 9 16 23 30 37 44 UNI -5.6 0 0
64. 8 15 22 29 36 43 UNI -7.77 0 0
65. 8 15 22 29 36 43 CON -25.47 0
66. 9 16 23 30 37 44 CON -19.125 0
67. 10 17 24 31 38 45 CON -24.75 0
68. LOAD 1 LOADTYPE SEISMIC-H  TITLE EQ X
69. 1893 LOAD X 1
70. LOAD 2 LOADTYPE SEISMIC-H  TITLE EQ -X
71. 1893 LOAD X -1.
72. LOAD 3 LOADTYPE SEISMIC-H  TITLE EQ Z
73. 1893 LOAD Z 1
74. LOAD 4 LOADTYPE SEISMIC-H  TITLE EQ -Z
75. 1893 LOAD Z -1.
76. LOAD 5 LOADTYPE DEAD  TITLE DL
77. SELFWEIGHT Y -1
```

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REG No. RSE100392019

THE PROPOSED RESIDENTIAL BUILDING STILT + 5 FLOORS AT - -- PAGE NO. 3

```
78. MEMBER LOAD
79. 8 TO 10 15 TO 17 22 TO 24 29 TO 31 36 TO 38 43 TO 45 UNI GY -9.8
80. 8 15 22 29 36 43 CON GY -25.47 3.29
81. 9 16 23 30 37 44 CON GY -19.125 3.555
82. 10 17 24 31 38 45 CON GY -24.75 1.494
83. LOAD 6 LOADTYPE LIVE  TITLE LL
84. MEMBER LOAD
85. 10 17 24 31 38 45 UNI GY -7.2
86. 9 16 23 30 37 44 UNI GY -5.6
87. 8 15 22 29 36 43 UNI GY -7.77
88. LOAD 7 LOADTYPE WIND  TITLE WL Z
89. WIND LOAD X 1 TYPE 1
*WARNING- NO MEMBERS LOADED FOR A WIND LOAD GENERATION.
90. LOAD 8 LOADTYPE WIND  TITLE WL -Z
91. WIND LOAD -Z -1 TYPE 1
92. LOAD COMB 9 1.5(DL+LL)
93. 5 1.5 6 1.5
94. LOAD COMB 10 1.2(DL+LL+EQX)
95. 5 1.2 6 1.2 1 1.2
96. LOAD COMB 11 1.2(DL+LL-EQX)
97. 5 1.2 6 1.2 2 1.2
98. LOAD COMB 12 1.2(DL+LL+EQZ)
99. 6 1.2 5 1.2 3 1.2
100. LOAD COMB 13 1.2(DL+LL-EQZ)
101. 5 1.2 6 1.2 4 1.2
102. LOAD COMB 14 1.5(DL+EQX)
103. 5 1.5 1 1.5
104. LOAD COMB 15 1.5(DL-EQX)
105. 5 1.5 2 1.5
106. LOAD COMB 16 1.5(DL+EQZ)
107. 5 1.5 3 1.5
108. LOAD COMB 17 1.5(DL-EQZ)
109. 5 1.5 4 1.5
110. LOAD COMB 18 0.9DL+1.5EQX
111. 5 0.9 1 1.5
112. LOAD COMB 19 0.9DL-1.5EQX
113. 5 0.9 2 1.5
114. LOAD COMB 20 0.9DL+1.5EQZ
115. 5 0.9 3 1.5
116. LOAD COMB 21 0.9DL-1.5EQZ
117. 5 0.9 4 1.5
118. LOAD COMB 22 1.2(DL+LL+WLZ)
119. 5 1.2 6 1.2 7 1.2
120. LOAD COMB 23 1.2(DL+LL-WLZ)
121. 5 1.2 6 1.2 8 1.2
122. LOAD COMB 24 1.5(DL+WLZ)
123. 5 1.5 7 1.5
124. LOAD COMB 25 1.5(DL-WLZ)
125. 5 1.5 8 1.5
126. LOAD COMB 26 0.9DL+1.5WLZ
```

THE PROPOSED RESIDENTIAL BUILDING STILT + 5 FLOORS AT - -- PAGE NO. 4

127. 5 0.9 7 1.5
128. LOAD COMB 27 0.9DL-1.5WLZ
129. 5 0.9 8 1.5
130. PERFORM ANALYSIS

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS	28	NUMBER OF MEMBERS	42
NUMBER OF PLATES	0	NUMBER OF SOLIDS	0
NUMBER OF SURFACES	0	NUMBER OF SUPPORTS	4

Using 64-bit analysis engine.

SOLVER USED IS THE IN-CORE ADVANCED MATH SOLVER

TOTAL PRIMARY LOAD CASES = 8, TOTAL DEGREES OF FREEDOM = 144
TOTAL LOAD COMBINATION CASES = 19 SO FAR.

**WARNING: IF THIS UBC/IBC ANALYSIS HAS TENSION/COMPRESSION
OR REPEAT LOAD OR RE-ANALYSIS OR SELECT OPTIMIZE, THEN EACH
UBC/IBC CASE SHOULD BE FOLLOWED BY PERFORM ANALYSIS & CHANGE.

***NOTE: Equivalent Static Analysis should preferably be performed for regular structures with approximate natural time period less than 0.4s and regular structures with height less than 15m in Seismic Zone II. Ref Cl.6.4.3 and 7.6 BASE SHEAR AND TIME PERIOD IN X

```
*********************************************************
* UNITS - KN    METE                                    *
* TIME PERIOD FOR X 1893 LOADING =    0.66000 SEC       *
* SA/G PER 1893=    2.500, LOAD FACTOR= 1.000           *
* VB PER 1893=    0.0800 X     1372.50=     109.80 KN   *
* VB Act Based on Clause 7.2.1 =      109.80 KN         *
* VB Min based on Clause 7.2.2 =       15.10 KN         *
*                                                       *
*********************************************************
```

***NOTE: Equivalent Static Analysis should preferably be performed for regular structures with approximate natural time period less than 0.4s and regular structures with height less than 15m in Seismic Zone II. Ref Cl.6.4.3 and 7.6 BASE SHEAR AND TIME PERIOD IN X

```
*********************************************************
* UNITS - KN    METE                                    *
* TIME PERIOD FOR X 1893 LOADING =    0.66000 SEC       *
* SA/G PER 1893=    2.500, LOAD FACTOR=-1.000           *
* VB PER 1893=    0.0800 X     1372.50=    -109.80 KN   *
* VB Act Based on Clause 7.2.1 =     -109.80 KN         *
* VB Min based on Clause 7.2.2 =      -15.10 KN         *
*                                                       *
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```
*********************************************************
* UNITS - KN    METE                                    *
* TIME PERIOD FOR Z 1893 LOADING =    0.66000 SEC       *
* SA/G PER 1893=    2.500, LOAD FACTOR= 1.000           *
* VB PER 1893=    0.0800 X     1372.50=     109.80 KN   *
* VB Act Based on Clause 7.2.1 =      109.80 KN         *
* VB Min based on Clause 7.2.2 =       15.10 KN         *
*                                                       *
*********************************************************
```

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```
*********************************************************
* UNITS - KN    METE                                    *
* TIME PERIOD FOR Z 1893 LOADING =    0.66000 SEC       *
* SA/G PER 1893=    2.500, LOAD FACTOR=-1.000           *
* VB PER 1893=    0.0800 X     1372.50=    -109.80 KN   *
* VB Act Based on Clause 7.2.1 =     -109.80 KN         *
* VB Min based on Clause 7.2.2 =      -15.10 KN         *
*                                                       *
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131. FINISH

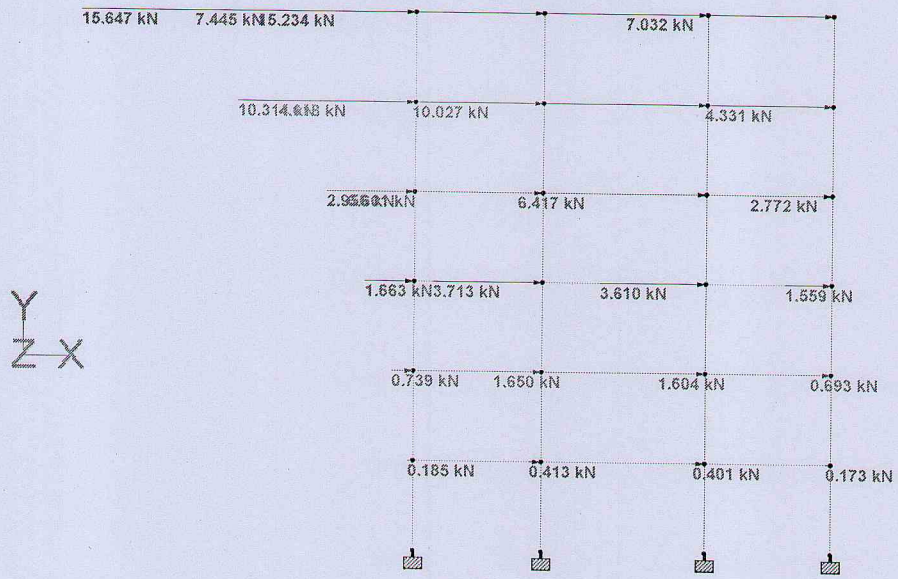
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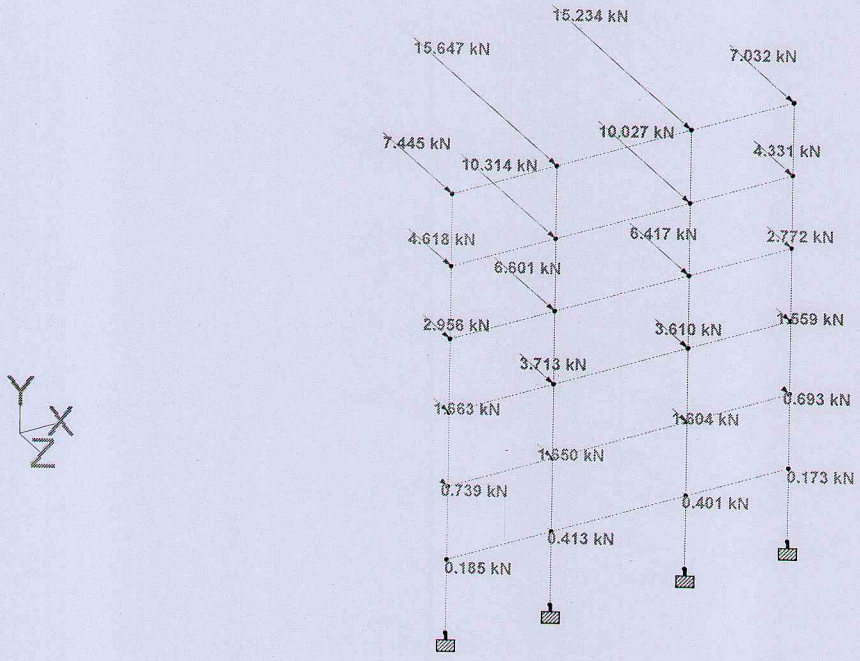
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*   For technical assistance on STAAD.Pro, please visit    *
*   http://www.bentley.com/en/support/                     *
*                                                          *
*   Details about additional assistance from               *
*   Bentley and Partners can be found at program menu      *
*   Help->Technical Support                                *
*                                                          *
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Load 1

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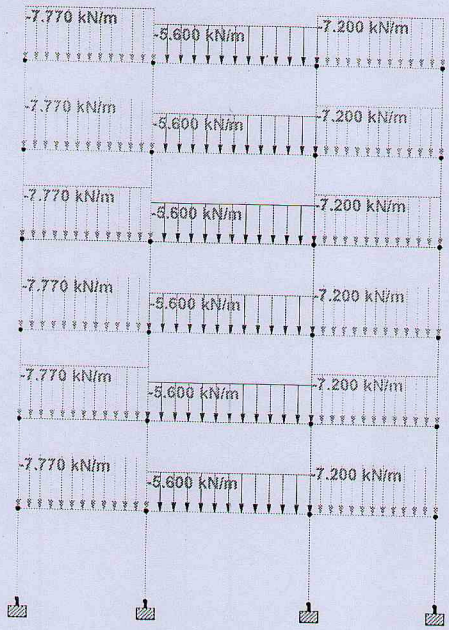
Load 3

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Load 5

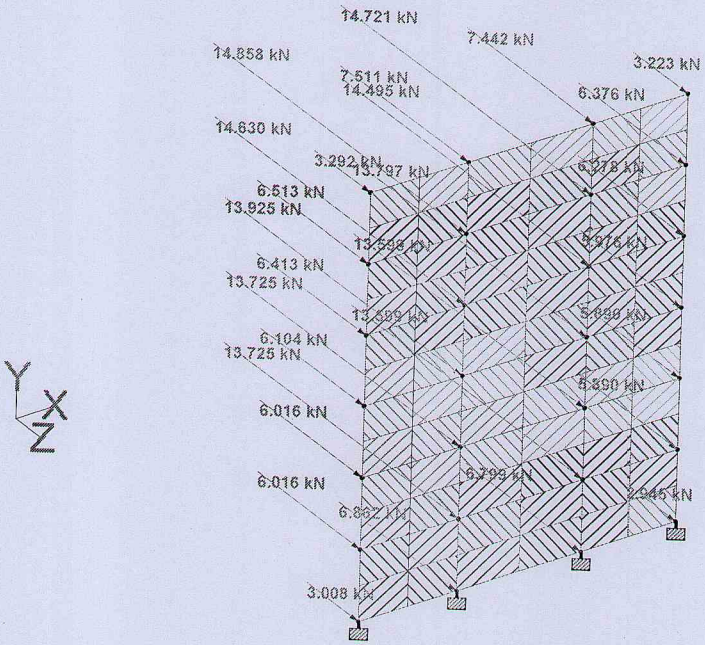
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Y
Z X

Load 6

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Load 7

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