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C.KANNAN, M.E. (Structure)
STRUCTURAL ENGINEER

Door .21, plot No. 257- W, Flat No. 2B
"Utopia Apartments" 2nd Floor,
4th Main Road, Indira Nagar,
Chennai- 600 020
Mobile: 9841249815
Email: kannankds2007@gmail.com

27-05-2024

STRUCTURAL STABILITY CERTIFICATE

It is certified that the Proposed Residential Building at Door No. 47/27 & 48A/28A, Babu Rajendra Prasad Street, West Mambalam, Chennai- 600 033, Comprised in Paimash No. 34, T. S. Nos. 15/7, 35/3 & 36, Block No. 7 Of Mambalam Village Within The Limit Of Greater Chennai Corporation. Having Stilt plus Three upper floors is designed to resist earthquake. Check has been made and found safe and I hereby certify that,

1. The minimum column width is 300 in stilt floor areas
2. The minimum grade of concrete is M25.
3. The design analysis using the code of practice for loading Standards as per IS-875 Part I to III and seismic force as per one code IS 1893, is carried out.

The Structure is safe and sound when used for the purpose for which it is designed.

C. KANNAN, B.E., M.E, (Structure)
Structural Engineer,
CMDA Reg. No: SE/I/2024/2/0047
Door No: 21, 4th Main Road,
Indira Nagar, Chennai-600 020.

PROPOSED RESIDENTIAL BUILDING AT DOOR NO. 47/27 & 48A/28A, BABU RAJENDRA PRASAD STREET, WEST MAMBALAM, CHENNAI- 600 033, COMPRISED IN PAIMASH NO. 34, T. S. NOS. 15/7, 35/3 & 36, BLOCK NO. 7 OF MAMBALAM VILLAGE WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION

GENERAL NOTE ON STRUCTURAL DESIGN.

1.0 GENERAL.

1.1 DESIGN BASIS

The proposed residential building consists of Stilt plus Three upper floors.

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

1.2 CODES AND STANDARDS

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

1. I.S. 456 - 2000
2. I.S. 875 - Part I to III
3. I.S.1893 - 2016

2.0 BASIC CIVIL DESIGN LOADS

2.1 DEAD LOADS & LIVE LOADS

Typical slab dead load is calculated as follows

Self weight of slab	=	3.25kN/m²
Floor finish	=	2.0kN/m²
Live load	=	2.0kN/m²
		7.25kN/m²

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3.0 SOIL DETAILS

Based on soil test report Shallow Foundation is adopted.

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

4.3 **MINIMUM COVER**

Slab	15 mm
Beam	25 mm
Columns	40 mm
Foundations	50 mm

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```
**************************************************
*                                                *
*          STAAD.Pro CONNECT Edition             *
*          Version  22.12.00.142                 *
*          Proprietary Program of                *
*          Bentley Systems, Inc.                 *
*          Date=    MAY 27, 2024                 *
*          Time=    17: 6:49                     *
*                                                *
*  Licensed to: C.Kannan                         *
**************************************************
```

```
     1. STAAD SPACE
INPUT FILE: D:\LOGESH\STABILITY CERTIFICATE\KCEE-WEST MAMBALAM\KCEE-WES.. .STD
     2. START JOB INFORMATION
     3. ENGINEER DATE 27-MAY-24
     4. JOB NAME PROPOSED RESIDENTIAL BUILDING AT DOOR NO. 47/27 & 48A/28A, BABU -
     5. RAJENDRA PRASAD STREET, WEST MAMBALAM, CHENNAI- 600 033, COMPRISED IN -
     6. PAIMASH NO. 34, T. S. NOS. 15/7, 35/3 & 36, BLOCK NO. 7 OF MAMBALAM VILLAGE -
     7. WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION
     8. ENGINEER NAME KANNAN
     9. CHECKER NAME KANNAN
    10. APPROVED NAME KANNAN
    11. CHECKER DATE 5/27/2024
    12. APPROVED DATE 5/27/2024
    13. END JOB INFORMATION
    14. INPUT WIDTH 79
    15. UNIT METER KN
    16. JOINT COORDINATES
    17. 1 0 0 0; 2 2.515 0 0; 3 8.43 0 0; 4 0 3 0; 5 2.515 3 0; 6 8.43 3 0; 7 0 6 0
    18. 8 2.515 6 0; 9 8.43 6 0; 10 0 9 0; 11 2.515 9 0; 12 8.43 9 0; 13 0 12 0
    19. 14 2.515 12 0; 15 8.43 12 0; 16 0 -3 0; 17 2.515 -3 0; 18 8.43 -3 0
    20. MEMBER INCIDENCES
    21. 1 1 2; 2 2 3; 3 1 4; 4 2 5; 5 3 6; 6 4 5; 7 5 6; 8 4 7; 9 5 8; 10 6 9; 11 7 8
    22. 12 8 9; 13 7 10; 14 8 11; 15 9 12; 16 10 11; 17 11 12; 18 10 13; 19 11 14
    23. 20 12 15; 21 13 14; 22 14 15; 23 16 1; 24 17 2; 25 18 3
    24. DEFINE MATERIAL START
    25. ISOTROPIC CONCRETE
    26. E 2.17185E+07
    27. POISSON 0.17
    28. DENSITY 23.5616
    29. ALPHA 1E-05
    30. DAMP 0.05
    31. G 9.28139E+06
    32. TYPE CONCRETE
    33. STRENGTH FCU 27579
    34. END DEFINE MATERIAL
    35. MEMBER PROPERTY
    36. 1 2 6 7 11 12 16 17 21 22 PRIS YD 0.45 ZD 0.23
    37. 3 TO 5 8 TO 10 13 TO 15 18 TO 20 23 TO 25 PRIS YD 0.45 ZD 0.23
    38. CONSTANTS
```

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```
  39. MATERIAL CONCRETE ALL
  40. SUPPORTS
  41. 16 TO 18 FIXED
  42. DEFINE IS1893 2016 LOAD
  43. ZONE 0.16 RF 5 I 1.2 SS 1 ST 1 DM 0.05 DT 3
  44. MEMBER WEIGHT
  45. 1 2 6 7 11 12 16 17 21 22 UNI 15 0 0
  46. 1 2 6 7 11 12 16 17 21 22 UNI 35 0 0
  47. SELFWEIGHT 1
  48. 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.

  49. TYPE 1 WIND 1
  50. <! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
  51. CUSTOM:PARAMS
  52. !> END GENERATED DATA BLOCK
  53. INT 1.35 1.49 HEIG  10  12
  54. EXP 1 JOINT 1 TO 18
  55. LOAD 1 LOADTYPE SEISMIC-H  TITLE EQ +X
  56. 1893 LOAD X 1
  57. LOAD 2 LOADTYPE SEISMIC-H  TITLE EQ -X
  58. 1893 LOAD X -1.
  59. LOAD 3 LOADTYPE SEISMIC-H  TITLE EQ +Z
  60. 1893 LOAD Z 1
  61. LOAD 4 LOADTYPE SEISMIC-H  TITLE EQ -Z
  62. 1893 LOAD Z -1.
  63. LOAD 5 LOADTYPE WIND  TITLE WIND +X
  64. WIND LOAD X 1 TYPE 1
*WARNING- NO MEMBERS LOADED FOR A WIND LOAD GENERATION.
  65. LOAD 6 LOADTYPE WIND  TITLE WIND -X
  66. WIND LOAD -X 1 TYPE 1
*WARNING- NO MEMBERS LOADED FOR A WIND LOAD GENERATION.
  67. LOAD 7 LOADTYPE WIND  TITLE WIND +Z
  68. WIND LOAD Z 1 TYPE 1
```

```
 69. LOAD 8 LOADTYPE WIND  TITLE WIND -Z
 70. WIND LOAD -Z 1 TYPE 1
 71. LOAD 9 LOADTYPE LIVE  TITLE LIVE LOAD
 72. MEMBER LOAD
 73. 1 2 6 7 11 12 16 17 21 22 UNI GY -15
 74. LOAD 10 LOADTYPE DEAD  TITLE DEAD LOAD
 75. SELFWEIGHT Y -1 LIST ALL
 76. MEMBER LOAD
 77. 1 2 6 7 11 12 16 17 21 22 UNI GY -35
 78. LOAD COMB 11 1.5(DL+IL)
 79. 9 1.5 10 1.5
 80. LOAD COMB 12 1.2(DL+IL+ELX)
 81. 9 1.5 10 1.2 1 1.2
 82. LOAD COMB 13 1.2(DL+IL-ELX)
 83. 9 1.2 10 1.2 2 1.2
 84. LOAD COMB 14 1.2(DL+IL+ELZ)
 85. 9 1.2 10 1.2 3 1.2
 86. LOAD COMB 15 1.2(DL+IL-ELZ)
 87. 9 1.2 10 1.2 4 1.2
 88. LOAD COMB 16 1.2(DL+IL+WLX)
 89. 9 1.2 10 1.2 5 1.2
 90. LOAD COMB 17 1.2(DL+IL-WLX)
 91. 10 1.2 6 1.2
 92. LOAD COMB 18 1.2(DL+IL+WLZ)
 93. 9 1.2 10 1.2 7 1.2
 94. LOAD COMB 19 1.2(DL+IL-WLZ)
 95. 9 1.2 10 1.2 8 1.2
 96. LOAD COMB 20 1.5(DL+ELX)
 97. 9 1.5 10 1.5 1 1.5
 98. LOAD COMB 21 1.5(DL-ELX)
 99. 9 1.5 10 1.5 2 1.5
100. LOAD COMB 22 1.5(DL+ELZ)
101. 9 1.5 10 1.5 3 1.5
102. LOAD COMB 23 1.5(DL-ELZ)
103. 10 1.5 4 1.5
104. LOAD COMB 24 1.5(DL+WLX)
105. 10 1.5 5 1.5
106. LOAD COMB 25 1.5(DL-WLX)
107. 10 1.5 6 1.5
108. LOAD COMB 26 1.5(DL+WLZ)
109. 10 1.5 7 1.5
110. LOAD COMB 27 1.5(DL-WLZ)
111. 10 1.5 8 1.5
112. LOAD COMB 28 0.9 DL+ELX
113. 10 0.9 1 1.5
114. LOAD COMB 29 0.9 DL-ELX
115. 10 0.9 2 1.5
116. LOAD COMB 30 0.9 DL+ELZ
117. 10 0.9 3 1.5
118. LOAD COMB 31 0.9 DL-ELZ
```

```
119. 10 0.9 4 1.5
120. LOAD COMB 32 0.9 DL+WLX
121. 10 0.9 5 1.5
122. LOAD COMB 33 0.9 DL-WLX
123. 10 0.9 6 1.5
124. LOAD COMB 34 0.9 DL+WLZ
125. 10 0.9 7 1.5
126. LOAD COMB 35 0.9 DL-WLZ
127. 10 0.9 8 1.5
128. PERFORM ANALYSIS PRINT ALL


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

  NUMBER OF JOINTS         18  NUMBER OF MEMBERS      25
  NUMBER OF PLATES          0  NUMBER OF SOLIDS        0
  NUMBER OF SURFACES        0  NUMBER OF SUPPORTS      3

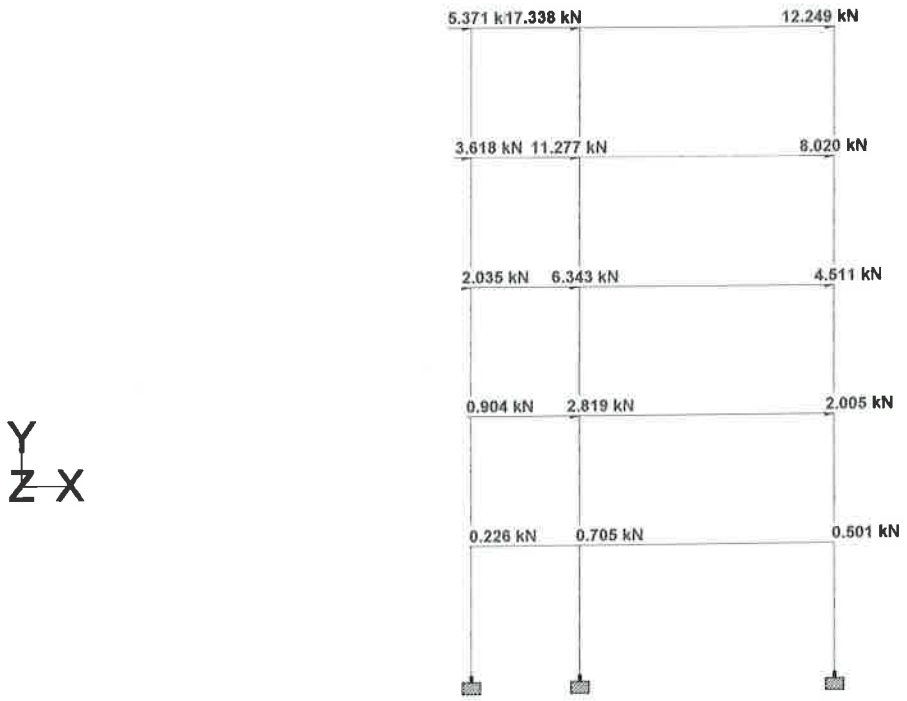
        Using 64-bit analysis engine.

        SOLVER USED IS THE IN-CORE ADVANCED MATH SOLVER

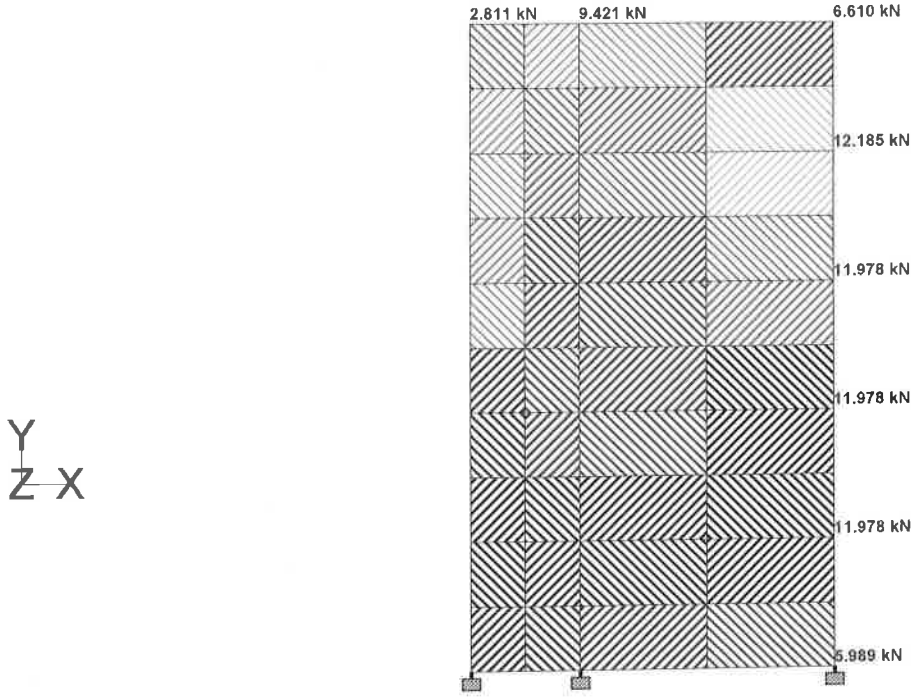
TOTAL      PRIMARY LOAD CASES =    10, TOTAL DEGREES OF FREEDOM =      90
TOTAL LOAD COMBINATION  CASES =    25  SO FAR.
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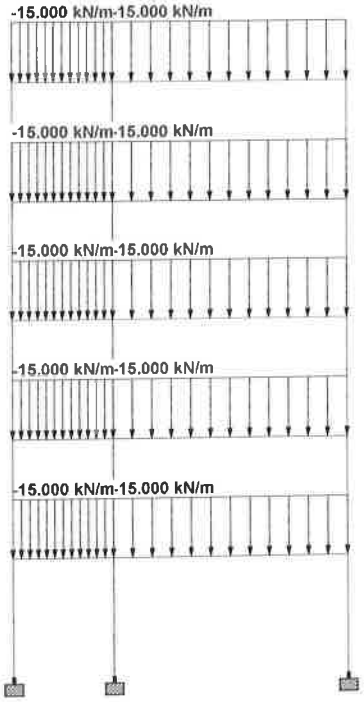
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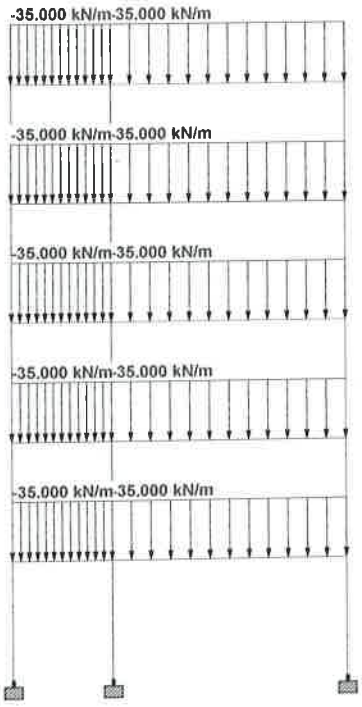

2.811 kN
9.421 kN
6.610 kN
12.185 kN
11.978 kN
11.978 kN
11.978 kN
5.989 kN
Y
Z
X

Load 7


-15.000 kN/m-15.000 kN/m
-15.000 kN/m-15.000 kN/m
-15.000 kN/m-15.000 kN/m
-15.000 kN/m-15.000 kN/m
-15.000 kN/m-15.000 kN/m


Y
Z
X

Load 9





Load 10

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