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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

STABILITY CERTIFICATE

(To be furnished while filing application for registration of building)

It is certified that "SHYAMALA" – Proposed Construction of Stilt + 5 Floors Residential Building with 10 Dwelling units at Plot No.397, Door No.81/39, First Avenue, Indira Nagar, Adyar, Chennai 600 020, Comprised in R.S No. 5/2Part (As per Document), As per Patta New R.S.No.3, Block No.15 situated at Kalikundram Village, Velachery Taluk, Chennai District, Within the Limits of Greater Chennai Coporation, Zone:13 & Division No:173 , Tamilnadu State. is designed to resist earthquake. Check has been made and found safe and I hereby certify that:

1. The minimum grade of concrete is M25

2. The design and analysis using the code of practice for plain and reinforced concrete as per IS 456, Design Loads as per IS-875 PART I TO III and Design of Earthquake resistant Structure as per IS-1893 are carried out.

The building will be safe and sound when used for the purpose for which it is designated.

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

Stamp and Signature

Encl.: Structural Design Calculation

"SHYAMALA" – PROPOSED CONSTRUCTION OF STILT + 5 FLOORS RESIDENTIAL BUILDING WITH 10 DWELLING UNITS AT PLOT NO.397, DOOR NO.81/39, FIRST AVENUE, INDIRA NAGAR, ADYAR, CHENNAI 600 020.
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 Pile 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

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

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```
**************************************************
*                                                *
*          STAAD.Pro CONNECT Edition             *
*          Version  22.12.00.142                 *
*          Proprietary Program of                *
*          Bentley Systems, Inc.                 *
*          Date=    OCT 22, 2024                 *
*          Time=    17: 5:52                     *
*                                                *
*  Licensed to: C.Kannan                         *
**************************************************
```

```
     1. STAAD SPACE
INPUT FILE: D:\AGAN\4.STABILITY\KAVIYA PROPERTIES-INDRA NAGAR\Staad\Kav.. .STD
     2. START JOB INFORMATION
     3. ENGINEER DATE 10/22/2024
     4. JOB NAME PLOT NO.397, R.S.NO. 5- PART, WARD NO.001, BLOCK NO.0015,T.S.NO.3, -
     5. OLD SURVEY NO. 5/2( PART) OF KALIKUNDRAM VILLAGE, DOOR NO. 81/39, 1ST -
     6. AVENUE, INDIRA NAGAR, ADAYAR, CHENNAI 20
     7. ENGINEER NAME KANNAN
     8. CHECKER NAME KANNAN
     9. CHECKER DATE 10/22/2024
    10. APPROVED DATE 10/22/2024
    11. END JOB INFORMATION
    12. INPUT WIDTH 79
    13. SET NL 250
    14. UNIT INCHES KN
    15. JOINT COORDINATES
    16. 1 0 118.11 0; 3 150.001 118.11 0.00841036; 6 474 118.11 0.000150185
    17. 61 0 236.22 0; 63 150.001 236.22 0.00841036; 65 474 236.22 0.000150185
    18. 122 0 0 0; 124 150.001 0 0.00841036; 126 474 0 0.000150185; 182 0 354.331 0
    19. 184 150.001 354.331 0.00841036; 186 474 354.331 0.000150185; 236 0 472.441 0
    20. 238 150.001 472.441 0.00841036; 240 474 472.441 0.000150185; 290 0 590.551 0
    21. 292 150.001 590.551 0.00841036; 294 474 590.551 0.000150185; 344 0 708.661 0
    22. 346 150.001 708.661 0.00841036; 348 474 708.661 0.000150185; 411 0 -78.7402 0
    23. 413 150.001 -78.7402 0.00841036; 414 474 -78.7402 0.000150185
    24. MEMBER INCIDENCES
    25. 2 1 3; 3 6 3; 78 61 63; 79 65 63; 167 122 124; 168 126 124; 256 182 184
    26. 257 186 184; 332 236 238; 333 240 238; 408 290 292; 409 294 292; 484 344 346
    27. 485 348 346; 575 411 122; 577 413 124; 578 414 126; 598 122 1; 599 1 61
    28. 600 61 182; 601 182 236; 602 236 290; 603 290 344; 610 124 3; 611 3 63
    29. 612 63 184; 613 184 238; 614 238 292; 615 292 346; 616 126 6; 617 6 65
    30. 618 65 186; 619 186 240; 620 240 294; 621 294 348
    31. UNIT METER KN
    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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```
39. G 9.28139E+06
40. TYPE CONCRETE
41. STRENGTH FCU 27579
42. END DEFINE MATERIAL
43. MEMBER PROPERTY
44. 575 577 578 598 TO 603 610 TO 621 PRIS YD 0.45 ZD 0.23
45. 2 3 78 79 167 168 256 257 332 333 408 409 484 485 PRIS YD 0.45 ZD 0.23
46. CONSTANTS
47. MATERIAL CONCRETE ALL
48. UNIT INCHES KN
49. SUPPORTS
50. 411 413 414 FIXED
51. UNIT METER KN
52. DEFINE IS1893 2016 LOAD
53. ZONE 0.16 RF 5 I 1.2 SS 1 ST 1 DM 0.05 DT 2
54. MEMBER WEIGHT
55. 2 3 78 79 167 168 256 257 332 333 408 409 484 485 UNI 12 0 0
56. 2 3 78 79 167 168 256 257 332 333 408 409 484 485 UNI 6 0 0
57. SELFWEIGHT 1
58. 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.

59. TYPE 1 WIND 1
60. <! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
61. CUSTOM:PARAMS
62. !> END GENERATED DATA BLOCK
63. INT 1.22 1.35 1.48 HEIG  10  15  18
64. EXP 1 JOINT 1 3 6 61 63 65 122 124 126 182 184 186 236 238 240 290 292 294 -
65. 344 346 348 411 413 414
66. LOAD 1 LOADTYPE SEISMIC-H  TITLE EQX
67. 1893 LOAD X 1
68. LOAD 2 LOADTYPE SEISMIC-H  TITLE EQX
69. 1893 LOAD X -1.
70. LOAD 3 LOADTYPE SEISMIC-V  TITLE EQZ
71. 1893 LOAD Z 1
72. LOAD 4 LOADTYPE SEISMIC-V  TITLE EQZ
73. 1893 LOAD Z -1.
74. LOAD 5 LOADTYPE WIND  TITLE WIND +X
75. WIND LOAD X 1 TYPE 1
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STAAD SPACE -- PAGE NO. 3

```
76. LOAD 6 LOADTYPE WIND  TITLE WIND -X
77. WIND LOAD -X 1 TYPE 1
78. LOAD 7 LOADTYPE WIND  TITLE WIND +Z
79. WIND LOAD Z 1 TYPE 1
80. LOAD 8 LOADTYPE WIND  TITLE WIND -Z
81. WIND LOAD -Z 1 TYPE 1
82. LOAD 9 LOADTYPE LIVE  TITLE L.L
83. MEMBER LOAD
84. 2 3 78 79 167 168 256 257 332 333 408 409 484 485 UNI GY -12
85. LOAD 10 LOADTYPE DEAD  TITLE D.L
86. SELFWEIGHT Y -1
87. MEMBER LOAD
88. 2 3 78 79 167 168 256 257 332 333 408 409 484 485 UNI GY -25
89. LOAD COMB 11 1.5(DL+IL)
90. 9 1.5 10 1.5
91. LOAD COMB 12 1.2(DL+IL+ELX)
92. 9 1.5 10 1.2 1 1.2
93. LOAD COMB 13 1.2(DL+IL-ELX)
94. 9 1.2 10 1.2 2 1.2
95. LOAD COMB 14 1.2(DL+IL+ELZ)
96. 9 1.2 10 1.2 3 1.2
97. LOAD COMB 15 1.2(DL+IL-ELZ)
98. 9 1.2 10 1.2 4 1.2
99. LOAD COMB 16 1.2(DL+IL+WLX)
100. 9 1.2 10 1.2 5 1.2
101. LOAD COMB 17 1.2(DL+IL-WLX)
102. 10 1.2 6 1.2
103. LOAD COMB 18 1.2(DL+IL+WLZ)
104. 9 1.2 10 1.2 7 1.2
105. LOAD COMB 19 1.2(DL+IL-WLZ)
106. 9 1.2 10 1.2 8 1.2
107. LOAD COMB 20 1.5(DL+ELX)
108. 9 1.5 10 1.5 1 1.5
109. LOAD COMB 21 1.5(DL-ELX)
110. 9 1.5 10 1.5 2 1.5
111. LOAD COMB 22 1.5(DL+ELZ)
112. 9 1.5 10 1.5 3 1.5
113. LOAD COMB 23 1.5(DL-ELZ)
114. 10 1.5 4 1.5
115. LOAD COMB 24 1.5(DL+WLX)
116. 10 1.5 5 1.5
117. LOAD COMB 25 1.5(DL-WLX)
118. 10 1.5 6 1.5
119. LOAD COMB 26 1.5(DL+WLZ)
```

```
120. 10 1.5 7 1.5
121. LOAD COMB 27 1.5(DL-WLZ)
122. 10 1.5 8 1.5
123. LOAD COMB 28 0.9 DL+ELX
124. 10 0.9 1 1.5
125. LOAD COMB 29 0.9 DL-ELX
126. 10 0.9 2 1.5
127. LOAD COMB 30 0.9 DL+ELZ
128. 10 0.9 3 1.5
129. LOAD COMB 31 0.9 DL-ELZ
130. 10 0.9 4 1.5
131. LOAD COMB 32 0.9 DL+WLX
132. 10 0.9 5 1.5
133. LOAD COMB 33 0.9 DL-WLX
134. 10 0.9 6 1.5
135. LOAD COMB 34 0.9 DL+WLZ
136. 10 0.9 7 1.5
137. LOAD COMB 35 0.9 DL-WLZ
138. 10 0.9 8 1.5
139. PERFORM ANALYSIS PRINT ALL
```

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

NUMBER OF JOINTS	24	NUMBER OF MEMBERS	35
NUMBER OF PLATES	0	NUMBER OF SOLIDS	0
NUMBER OF SURFACES	0	NUMBER OF SUPPORTS	3

Using 64-bit analysis engine.

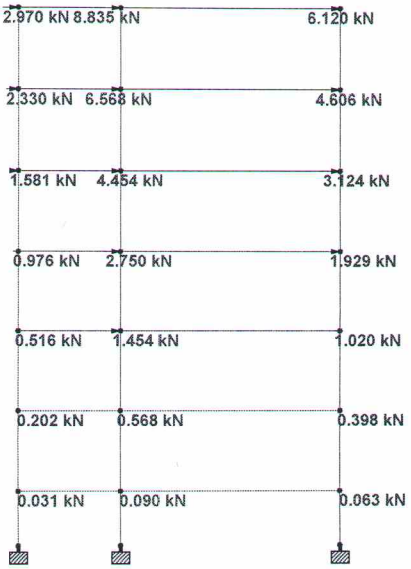
SOLVER USED IS THE IN-CORE ADVANCED MATH SOLVER

TOTAL PRIMARY LOAD CASES = 10, TOTAL DEGREES OF FREEDOM = 126
TOTAL LOAD COMBINATION CASES = 25 SO FAR.



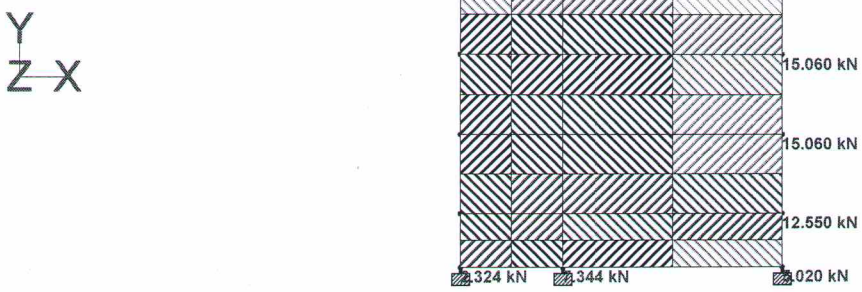
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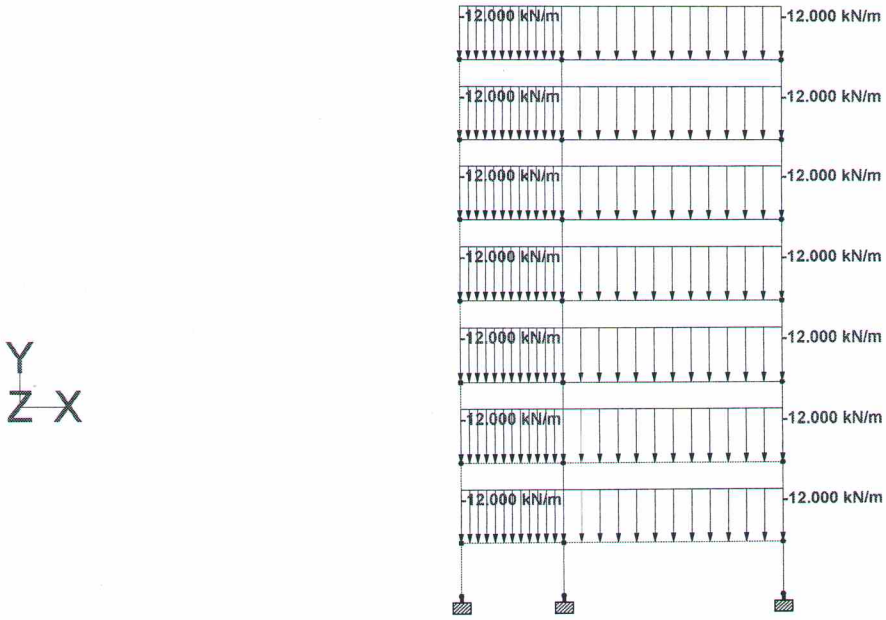


Load 1

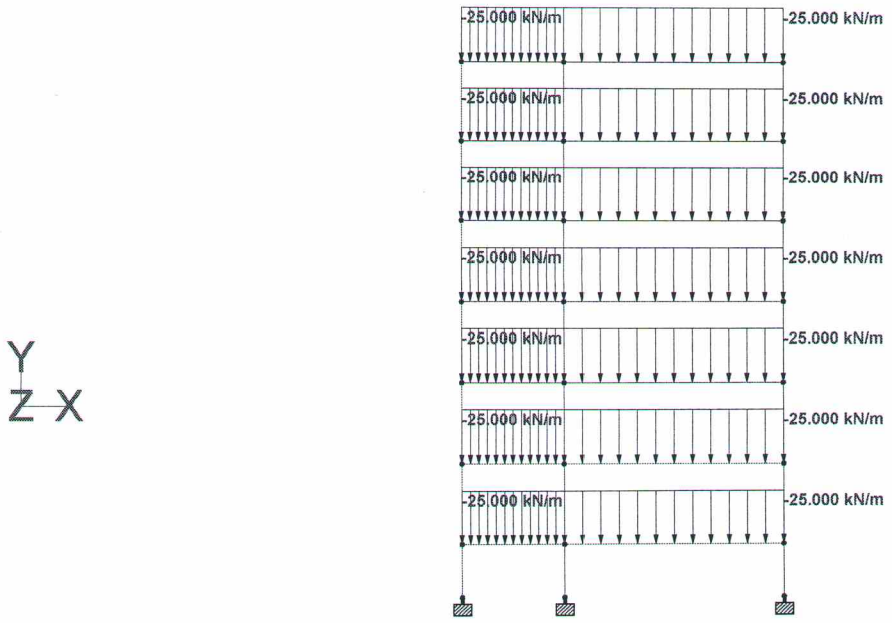
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Y
Z
X
9.135 kN
17.467 kN
16.665 kN
15.328 kN
15.060 kN
15.060 kN
12.550 kN
.324 kN
.344 kN
.020 kN

Load 7


-12.000 kN/m
-12.000 kN/m
-12.000 kN/m
-12.000 kN/m
-12.000 kN/m
-12.000 kN/m
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-12.000 kN/m
-12.000 kN/m
-12.000 kN/m
-12.000 kN/m
Y
Z X

Load 9



Load 10

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