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EFFECT OF ROOFTOP MOUNTED TELECOMMUNICATION TOWER ON DESIGN OF THE BUILDING STRUCTURE

Faria Aseem[1], Abdul Quadir[2]

[1]*Assistant professor at Lords Institute of Engineering and Technology Hyderabad, India*
[2]*Senior Structural Engineer Hyderabad, India*

Abstract: *The increase in demand of telecommunication towers caused due to technological advances with the compulsion to provide efficient communication. Consequently, telecommunication sector in the country has expanded rapidly. In today's era the mobile sector is growing dynamically and trend of mobile communication is increasing day by day.*

Generally for telecommunication purpose, the four legged supporting tower are used widely. Nowadays mostly the telecommunication towers as we see are mounted on rooftops of structures like commercial buildings, hotels and etc.

In this paper we have presented the results of design of (G+3) commercial building of plot area 144 sq.m with telecommunication tower mounted on its rooftop. Tower is of height 12m and the loads which are considered are dead load, live load and wind load.

The concrete design was carried out by IS 456-2000, SP-16 & the steel design was carried out by IS 800-2007 by using STAAD PRO software. The design with chosen structural sections found to be safe and the structure withstand all the above mentioned design loads.

Keywords CommerciaL Building, Telecommunication tower, *STAAD PRO*.

I. INTRODUCTION

Radio masts and towers are, typically, tall structures designed to support antennas (also known as aerials) for telecommunications and broadcasting, including television. There are two main types: guyed and self-supporting structures. They are among the tallest man-made structures. Masts are often named after the broadcasting organizations that originally built them or currently use them. In the case of a mast they are called radiator or radiating tower, the whole mast or tower is itself the transmitting antenna. They are also known as Telecommunication towers.

A commercial building is a building that is used for commercial purpose. Types can include office buildings, warehouses, or retail (i.e. convenience stores, big box stores, shopping malls, etc.). In urban locations, a commercial building often combines functions, such as an office on levels 2-10, with retail on floor 1. When space allocated to multiple functions is significant, these buildings can be called multi-use. Local authorities commonly maintain strict regulations on commercial zoning, and have the authority to designate any zoned area as such. A business must be located in a commercial area or area zoned at least partially for commerce.

People are structurally illiterate and want to install the telecommunication tower on the existing buildings for the sake of additional earning without caring for public safety. Such installed tower are the potential hazards for the public and may cause fatal accidents.

This study is aim to find out if the forces in telecommunication tower design to be installed at ground level is similar to the tower design with building model.

Also to find out if the load on building structure is nominal and can withstand the by the building elements easily or not.

II. LITERATURE REVIEW

Amiri and Boostan (2000) studied the dynamic response of antenna-supporting structures. In this regard, self-supporting steel telecommunication towers with different heights were evaluated considering the wind and earthquake loads. A comparison is made between the results of wind and earthquake loading. These comparisons resulted in the necessity of considering earthquake loads in tower analysis and design.

Nitin Bhosale (2012) has carried out the seismic response of 4 legged telecommunication towers under the effect of design spectrum from the Indian code of practice for zone – IV. The axial forces of the tower member were considered and comparison between roof top mounted tower and tower supported at ground had been performed to find out the difference.

Richa Bhatt (2013) carried out study on the influence of modelling in lattice mobile towers under wind loading wherein the towers are analyzed for gust factor wind. Displacements, Member forces and maximum stress have been compared to find out the effect on towers.

III. PLAN AND SPECIFICATIONS

A. *Building specifications*

Type of building	Commercial Building
Height of the building	12m
Number of stories	Four (G+3)
Floor-to-Floor height	3m
Materials	M25 for beams M30 for columns Fe-415 for steel
Column size	450mm × 360mm
Beam size	360mm × 300mm
Depth of Slab	150mm

B. *Tower specifications*

Height of tower	12m
Location	Centrally located on rooftop
Beams	I-section

C. *Commercial building with tower*

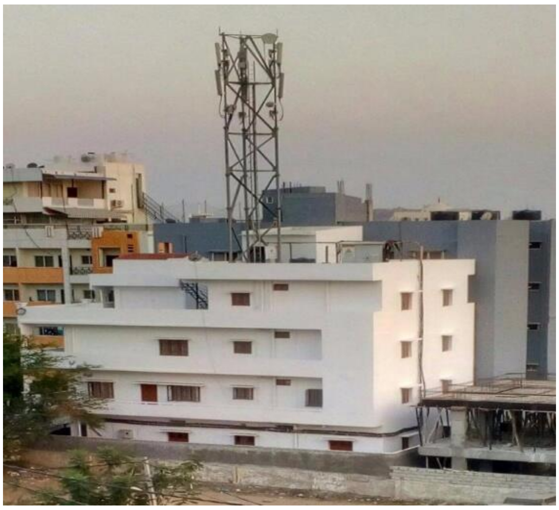

Fig 1. Existing structure

IV. RESULTS AND DISCUSSIONS

Modelling

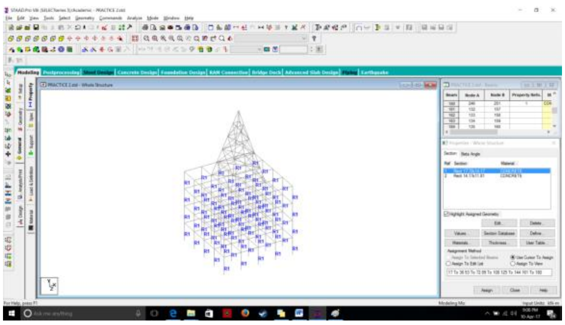

Fig 2. Assigning beam property

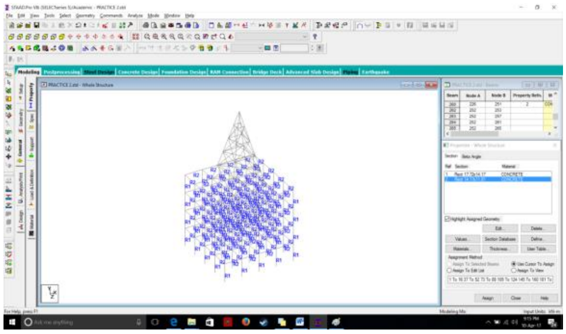

Fig 3. Assigning beam and column properties

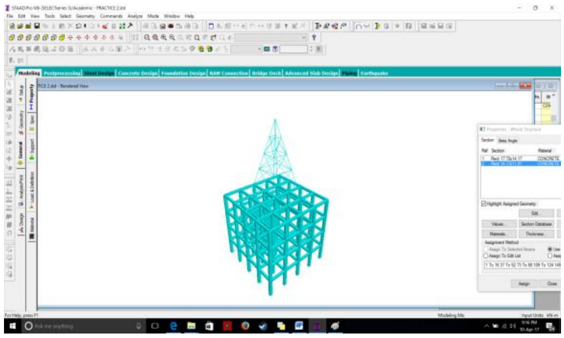

Fig 4. Rendering view of beams and columns

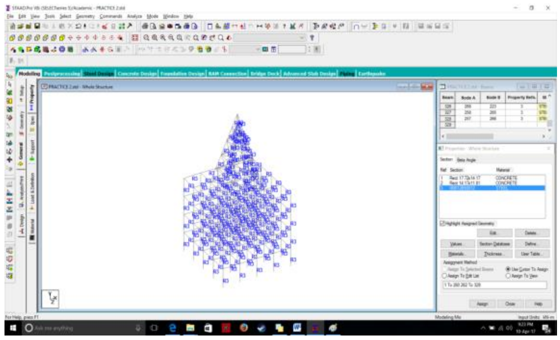

Fig 5. Assigning tower property

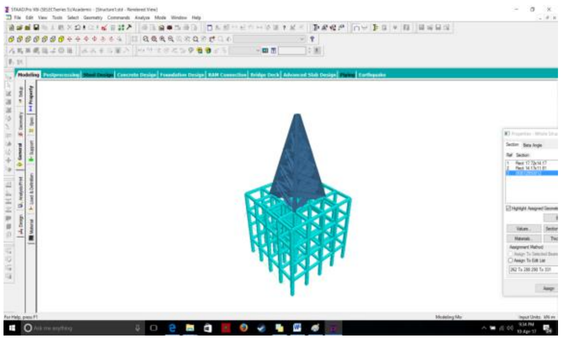

Fig 6. 3D rendering of whole structure

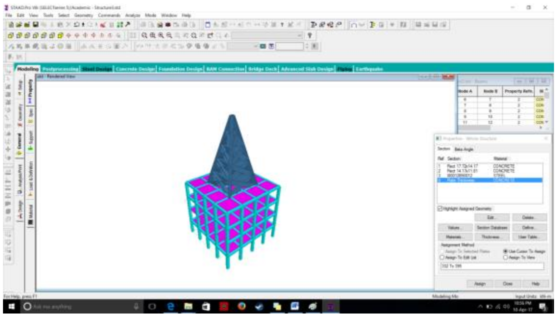

Fig 7. Assigned plates for slab

The bay frame building structure was modelled, Steel tower was modeled centrally upon it. The bay frame selected is of G+3, each storey of height 3 metres. The tower is of height 12m.

V. RCC DESIGNING

Member 1 - Main Steel Summary

Distance	Span	Moment	As Req.	As' Req.	Bottom Layers		Top Layers	
(m)		(kNm)	(mm^2)	(mm^2)	Bars	Area	Bars	Area
0.000	1(s)	20.688	197	0		201		339
		0.000	198	0				
0.225	1	12.288	197	0		201		339
		0.000	198	0				
0.250	1	11.355	197	0		201		339
		0.000	198	0				
0.500	1	4.463	197	0		201		339
		-0.788	198	0				
0.750	1	0.639	197	0		201		339
		-4.037	198	0				
1.000	1	0.000	197	0		201		339
		-8.275	198	0				
1.250	1	0.000	197	0		201		339
		-11.404	198	0				
1.500	1	0.000	197	0		201		339
		-12.475	198	0				
1.750	1	0.000	197	0		201		339
		-11.461	198	0				
2.000	1	0.000	197	0		201		339
		-8.388	198	0				
2.250	1	0.136	197	0		201		339
		-3.975	198	0				
2.500	1	4.084	197	0		201		339
		-0.883	198	0				
2.750	1	11.070	197	0		201		339
		0.000	198	0				
2.775	1	11.998	197	0		201		339
		0.000	198	0				
3.000	1(e)	20.346	197	0		201		339
		0.000	198	0				
3.000	2(s)	21.268	197	0		201		339
		0.000	198	0				
3.225	2	12.917	197	0		201		339
		0.000	198	0				
3.250	2	11.989	197	0		201		339
		0.000	198	0				
3.500	2	4.776	197	0		201		339
		-0.419	198	0				
3.750	2	0.525	197	0		201		339
		-3.240	198	0				
4.000	2	0.000	197	0		201		339
		-7.480	198	0				
4.250	2	0.000	197	0		201		339
		-10.556	198	0				
4.500	2	0.000	197	0		201		339

Fig 8. Main steel summary of member 1

Member 1 - Main Steel Summary Cont...

Distance	Span	Moment	As Req.	As' Req.	Bottom Layers		Top Layers	
(m)		(kNm)	(mm^2)	(mm^2)	Bars	Area	Bars	Area
		-11.574	198	0				
4.750	2	0.000	197	0		201		339
		-10.506	198	0				
5.000	2	0.000	197	0		201		339
		-7.381	198	0				
5.250	2	0.688	197	0		201		339
		-3.129	198	0				
5.500	2	4.944	197	0		201		339
		-0.228	198	0				
5.750	2	12.238	197	0		201		339
		0.000	198	0				
5.775	2	13.171	197	0		201		339
		0.000	198	0				
6.000	2(e)	21.567	197	0		201		339
		0.000	198	0				
6.000	3(s)	21.562	197	0		201		339
		0.000	198	0				
6.225	3	13.166	197	0		201		339
		0.000	198	0				
6.250	3	12.233	197	0		201		339
		0.000	198	0				
6.500	3	4.941	197	0		201		339
		-0.231	198	0				
6.750	3	0.685	197	0		201		339
		-3.132	198	0				
7.000	3	0.000	197	0		201		339
		-7.383	198	0				
7.250	3	0.000	197	0		201		339
		-10.507	198	0				
7.500	3	0.000	197	0		201		339
		-11.574	198	0				
7.750	3	0.000	197	0		201		339
		-10.555	198	0				
8.000	3	0.000	197	0		201		339
		-7.478	198	0				
8.250	3	0.528	197	0		201		339
		-3.238	198	0				
8.500	3	4.779	197	0		201		339
		-0.415	198	0				
8.750	3	11.994	197	0		201		339
		0.000	198	0				
8.775	3	12.922	197	0		201		339
		0.000	198	0				
9.000	3(e)	21.274	197	0		201		339
		0.000	198	0				

Fig 9. Member 1 continued

Member 1 - Main Steel Summary Cont...

Distance	Span	Moment	As Req.	As' Req.	Bottom Layers		Top Layers	
(m)		(kNm)	(mm^2)	(mm^2)	Bars	Area	Bars	Area
9.000	4(s)	21.274	197	0		201		339
		0.000	198	0				
9.225	4	11.992	197	0		201		339
		0.000	198	0				
9.250	4	11.065	197	0		201		339
		0.000	198	0				
9.500	4	4.080	197	0		201		339
		-0.887	198	0				
9.750	4	0.133	197	0		201		339
		-3.978	198	0				
10.000	4	0.000	197	0		201		339
		-8.390	198	0				
10.250	4	0.000	197	0		201		339
		-11.461	198	0				
10.500	4	0.000	197	0		201		339
		-12.474	198	0				
10.750	4	0.000	197	0		201		339
		-11.402	198	0				
11.000	4	0.000	197	0		201		339
		-8.272	198	0				
11.250	4	0.643	197	0		201		339
		-4.034	198	0				
11.500	4	4.467	197	0		201		339
		-0.784	198	0				
11.750	4	11.360	197	0		201		339
		0.000	198	0				
11.775	4	12.294	197	0		201		339
		0.000	198	0				
12.000	4(e)	20.694	197	0		201		339
		0.000	198	0				

Summary: the member is **safe**

Fig 10. Member 1 continued

Member 1 - Main Reinforcing Bars

Bar	Size	Design Length Start (m)	Design Length End (m)	Anchorage (cm)
1	8	0.001	11.999	32.3
2	8	0.001	11.999	32.3
3	8	0.001	11.999	32.3
4	8	0.001	11.999	32.3
5	12	0.001	11.999	48.3
6	12	0.001	11.999	48.3
7	12	0.001	11.999	48.3

Fig 11. Main reinforcing bars of member 1

Member 1 - Scheduled Bars

Bar Mark	Type and size	No. of bars	Bar Length (mm)	Shape code	A (mm)	B (mm)	C (mm)	D (mm)	E/R (mm)
01	T8	4	12625	21	125	12400			
02	T12	3	12900	21	285	12400			
03	T8	84	1200	51	305	245			

The shape codes are based on Table B-2 of IS SP:34-1987

Fig 12. Scheduled bars of member 1

RCC Column Design

Column Main Reinforcement

Member	L/C	Axial (kN)	Major (kNm)	Minor (kNm)	Design Axis	As Req. (mm²)	Total Bars	As Prov. (mm²)
M41	C5	391.689	8.908	8.194	Biaxl min	1357	12T12	1357
M42	C5	608.828	0.420	12.177	Biaxl min	1357	12T12	1357
M43	L3	0.000	3.089	0.000	maj	2262	20T12	2262
M44	C5	608.865	0.424	12.177	Biaxl min	1357	12T12	1357
M45	C5	391.737	8.909	8.196	Biaxl min	1357	12T12	1357
M46	C5	295.946	12.035	11.398	Biaxl min	1357	12T12	1357
M47	C5	459.084	0.862	16.934	Biaxl min	1357	12T12	1357
M48	L3	0.000	2.538	0.000	maj	2262	20T12	2262
M49	C5	459.118	0.868	16.936	Biaxl min	1357	12T12	1357
M50	C5	295.987	12.041	11.403	Biaxl min	1357	12T12	1357
M51	C5	197.225	11.594	10.919	Biaxl min	1357	12T12	1357
M52	C5	307.433	2.188	17.124	Biaxl min	1357	12T12	1357
M53	L3	0.000	2.417	0.000	maj	2262	20T12	2262
M54	C5	307.460	2.198	17.135	Biaxl min	1357	12T12	1357
M55	C5	197.252	11.601	10.927	Biaxl min	1357	12T12	1357
M56	C5	96.149	21.048	18.959	Biaxl min	1357	12T12	1357
M57	C5	153.445	1.767	32.085	Biaxl min	1357	12T12	1357
M58	L3	-0.000	2.008	0.000	maj	2262	20T12	2262
M59	C5	153.462	1.781	32.108	Biaxl min	1357	12T12	1357
M60	C5	96.160	21.055	18.968	Biaxl min	1357	12T12	1357
M61	C5	616.765	12.983	12.335	Biaxl min	1357	12T12	1357
M62	C5	1108.109	0.690	22.162	Biaxl min	1357	12T12	1357
M63	L3	0.001	3.139	0.000	maj	2262	20T12	2262
M64	C5	1108.182	0.692	22.164	Biaxl min	1357	12T12	1357
M65	C5	616.799	12.984	12.336	Biaxl min	1357	12T12	1357
M66	C5	465.329	18.019	9.307	Biaxl maj	1357	12T12	1357
M67	C5	884.661	1.401	17.693	Biaxl min	1357	12T12	1357
M68	L3	0.001	2.594	0.000	maj	2262	20T12	2262
M69	C5	884.736	1.407	17.695	Biaxl min	1357	12T12	1357
M70	C5	465.360	18.020	9.307	Biaxl maj	1357	12T12	1357
M71	C5	312.042	18.342	6.241	Biaxl maj	1357	12T12	1357
M72	C5	672.140	2.717	13.443	Biaxl min	1357	12T12	1357
M73	L3	0.001	2.621	0.000	maj	2262	20T12	2262
M74	C5	672.221	2.726	13.444	Biaxl min	1357	12T12	1357
M75	C5	312.067	18.355	6.241	Biaxl maj	1357	12T12	1357
M76	C5	156.438	36.395	3.129	Biaxl maj	1357	12T12	1357
M77	C5	470.823	4.556	9.416	Biaxl min	1357	12T12	1357
M78	L3	-0.000	2.733	0.000	maj	2262	20T12	2262
M79	C5	470.913	4.600	9.418	Biaxl min	1357	12T12	1357
M80	C5	156.449	36.419	3.129	Biaxl maj	1357	12T12	1357
M81	C5	608.725	12.438	12.174	Biaxl min	1357	12T12	1357
M82	C5	941.661	0.673	18.833	Biaxl min	1357	12T12	1357
M83	L3	0.000	3.204	0.000	maj	2262	20T12	2262
M84	C5	941.603	0.674	18.832	Biaxl min	1357	12T12	1357
M85	C5	608.712	12.438	12.174	Biaxl min	1357	12T12	1357

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Fig 13.Column main reinforcement

Column Main Reinforcement Cont...

Member	L/C	Axial (kN)	Major (kNm)	Minor (kNm)	Design Axis	As Req. (mm²)	Total Bars	As Prov. (mm²)
M86	C5	458.952	16.869	9.179	Biaxl maj	1357	12T12	1357
M87	C5	709.966	1.379	14.199	Biaxl min	1357	12T12	1357
M88	L3	0.000	2.731	0.000	maj	2262	20T12	2262
M89	C5	709.912	1.380	14.198	Biaxl min	1357	12T12	1357
M90	C5	458.940	16.868	9.179	Biaxl maj	1357	12T12	1357
M91	C5	306.394	16.416	6.128	Biaxl maj	1357	12T12	1357
M92	C5	476.975	3.246	9.540	Biaxl min	1357	12T12	1357
M93	L3	0.000	2.698	0.000	maj	2262	20T12	2262
M94	C5	476.930	3.245	9.539	Biaxl min	1357	12T12	1357
M95	C5	306.385	16.414	6.128	Biaxl maj	1357	12T12	1357
M96	C5	151.557	29.734	3.031	Biaxl maj	1357	12T12	1357
M97	C5	242.176	2.847	4.844	Biaxl min	1357	12T12	1357
M98	L3	0.000	2.414	0.000	maj	2262	20T12	2262
M99	C5	242.137	2.848	4.843	Biaxl min	1357	12T12	1357
M100	C5	151.552	29.729	3.031	Biaxl maj	1357	12T12	1357
M101	C5	616.967	12.992	12.339	Biaxl min	1357	12T12	1357
M102	C5	1110.288	0.692	22.206	Biaxl min	1357	12T12	1357
M103	L4	-0.000	3.138	0.000	maj	2262	20T12	2262
M104	C5	1109.641	0.690	22.193	Biaxl min	1357	12T12	1357
M105	C5	616.870	12.989	12.337	Biaxl min	1357	12T12	1357
M106	C5	465.513	18.041	9.310	Biaxl maj	1357	12T12	1357
M107	C5	886.906	1.408	17.738	Biaxl min	1357	12T12	1357
M108	L4	-0.000	2.593	0.000	maj	2262	20T12	2262
M109	C5	886.240	1.406	17.725	Biaxl min	1357	12T12	1357
M110	C5	465.425	18.033	9.308	Biaxl maj	1357	12T12	1357
M111	C5	312.192	18.379	6.244	Biaxl maj	1357	12T12	1357
M112	C5	674.519	2.703	13.490	Biaxl min	1357	12T12	1357
M113	L4	-0.000	2.618	0.000	maj	2262	20T12	2262
M114	C5	673.814	2.687	13.476	Biaxl min	1357	12T12	1357
M115	C5	312.119	18.361	6.242	Biaxl maj	1357	12T12	1357
M116	C5	156.516	36.522	3.130	Biaxl maj	1357	12T12	1357
M117	C5	473.422	4.684	9.468	Biaxl min	1357	12T12	1357
M118	C5	243.642	0.010	4.873	Biaxl min	1357	12T12	1357
M119	C5	472.652	4.706	9.453	Biaxl min	1357	12T12	1357
M120	C5	156.470	36.458	3.129	Biaxl maj	1357	12T12	1357
M121	C5	391.760	8.909	8.196	Biaxl min	1357	12T12	1357
M122	C5	609.025	0.423	12.180	Biaxl min	1357	12T12	1357
M123	L3	0.000	2.942	0.000	maj	2262	20T12	2262
M124	C5	608.949	0.420	12.179	Biaxl min	1357	12T12	1357
M125	C5	391.699	8.908	8.194	Biaxl min	1357	12T12	1357
M126	C5	296.007	12.043	11.405	Biaxl min	1357	12T12	1357
M127	C5	459.265	0.868	16.955	Biaxl min	1357	12T12	1357
M128	L3	0.000	2.417	0.000	maj	2262	20T12	2262
M129	C5	459.197	0.862	16.948	Biaxl min	1357	12T12	1357
M130	C5	295.956	12.036	11.399	Biaxl min	1357	12T12	1357

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Fig 14.Column Main reinforcement continued

Column Main Reinforcement Cont...

Member	L/C	Axial (kN)	Major (kNm)	Minor (kNm)	Design Axis	As Req. (mm²)	Total Bars	As Prov. (mm²)
M131	C5	197.267	11.604	10.929	Biaxl min	1357	12T12	1357
M132	C5	307.580	2.198	17.156	Biaxl min	1357	12T12	1357
M133	L3	0.000	2.298	0.000	maj	2262	20T12	2262
M134	C5	307.527	2.187	17.139	Biaxl min	1357	12T12	1357
M135	C5	197.232	11.595	10.921	Biaxl min	1357	12T12	1357
M136	C5	96.167	21.062	18.977	Biaxl min	1357	12T12	1357
M137	C5	153.535	1.783	32.197	Biaxl min	1357	12T12	1357
M138	L3	0.000	1.905	0.000	maj	2262	20T12	2262
M139	C5	153.513	1.770	32.152	Biaxl min	1357	12T12	1357
M140	C5	96.152	21.050	18.967	Biaxl min	1357	12T12	1357

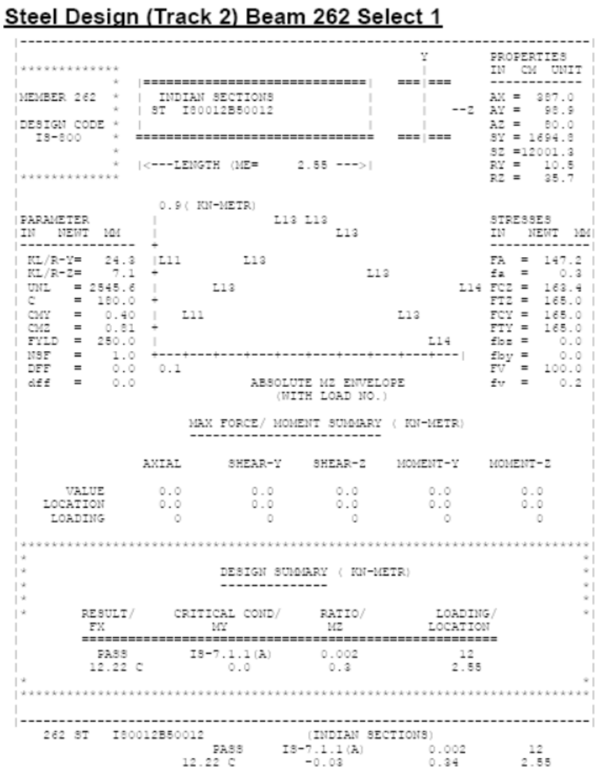
Fig 15. Column main reinforcement continued

Member 41 - Scheduled Bars

Bar Mark	Type and size	No. of bars	Bar Length (mm)	Shape code	A (mm)	B (mm)	C (mm)	D (mm)	E/R (mm)
01	T12	12	3025	00					
02	T8	32	525	13	125	275	50		
03	T8	16	1400	51	365	275			
04	T8	32	625	13	125	365	50		

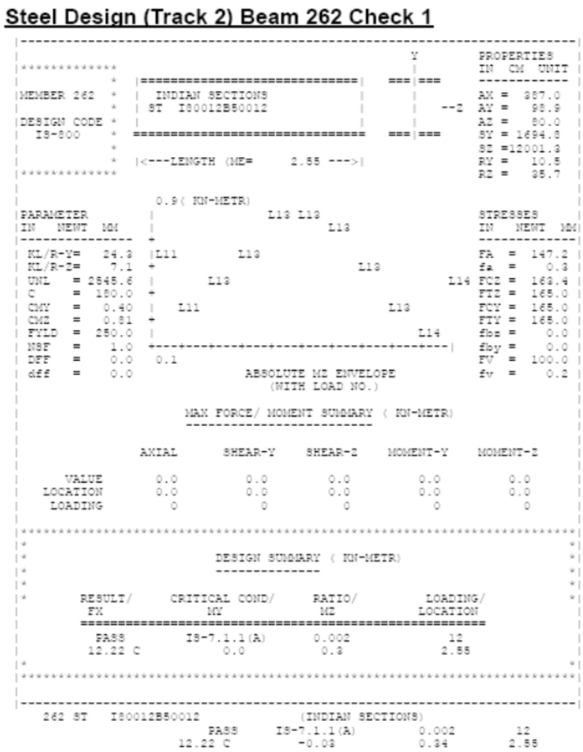
Fig 16. Column Schedule bars of member 41

VI. STEEL TOWER MEMBER DESIGN



```
Steel Design (Track 2) Beam 262 Select 1
|--------------------------------------------------------------------------|
|                                                  Y         PROPERTIES   |
|*************                                     |         IN  CM  UNIT |
|            *  |================================|  ===|===  ------------ |
|MEMBER 262  *  |  INDIAN SECTIONS               |     |     AX =   387.0 |
|            *  | ST  I80012B50012               |     |  --Z AY =    98.9 |
|DESIGN CODE *  |                                |     |     AZ =    80.0 |
|  IS-800    *  ================================   ===|===  SY = 1694.8 |
|            *                                               SZ =12001.3 |
|            *  |<---LENGTH (ME=     2.55 --->|               RY =    10.5 |
|*************                                               RZ =    35.7 |
|                                                                         |
|                  0.9( KN-METR)                                          |
|PARAMETER       |              L13 L13                     STRESSES     |
|IN   NEWT  MM   |                     L13                  IN   NEWT  MM|
|--------------- +                                          -------------|
| KL/R-Y=   24.3 |L11      L13                              FA  =  147.2 |
| KL/R-Z=    7.1 +                       L13                fa  =    0.3 |
| UNL   = 2545.6 |      L13                            L14  FCZ =  163.4 |
| C     =  180.0 +                                          FTZ =  165.0 |
| CMY   =   0.40 |   L11                    L13             FCY =  165.0 |
| CMZ   =   0.81 +                                          FTY =  165.0 |
| FYLD  =  250.0 |                              L14         fbz =    0.0 |
| NSF   =    1.0 +---+---+---+---+---+---+---+---+---|      fby =    0.0 |
| DFF   =    0.0  0.1                                       FV  =  100.0 |
| dff   =    0.0            ABSOLUTE MZ ENVELOPE            fv  =    0.2 |
|                             (WITH LOAD NO.)                             |
|                                                                         |
|                 MAX FORCE/ MOMENT SUMMARY ( KN-METR)                    |
|                 -------------------------                               |
|                                                                         |
|              AXIAL      SHEAR-Y    SHEAR-Z    MOMENT-Y    MOMENT-Z      |
|                                                                         |
|     VALUE     0.0         0.0        0.0         0.0         0.0        |
|  LOCATION     0.0         0.0        0.0         0.0         0.0        |
|   LOADING      0           0          0           0           0         |
|                                                                         |
|*************************************************************************|
|*                                                                       *|
|*                   DESIGN SUMMARY ( KN-METR)                           *|
|*                   --------------                                      *|
|*                                                                       *|
|*       RESULT/      CRITICAL COND/     RATIO/          LOADING/        *|
|         FX              MY              MZ            LOCATION         |
|        ========================================================        |
|         PASS        IS-7.1.1(A)        0.002             12            |
|        12.22 C          0.0             0.3             2.55            |
|*                                                                       *|
|*************************************************************************|
|                                                                         |
|-------------------------------------------------------------------------|
    262 ST   I80012B50012              (INDIAN SECTIONS)
                  PASS      IS-7.1.1(A)        0.002       12
               12.22 C        -0.03            0.34        2.55
```

Fig 17. Sample member Steel design track of member 262 of tower



```
Steel Design (Track 2) Beam 262 Check 1
|--------------------------------------------------------------------------|
|                                                  Y         PROPERTIES   |
|*************                                     |         IN  CM  UNIT |
|            *  |================================|  ===|===  ------------ |
|MEMBER 262  *  |  INDIAN SECTIONS               |     |     AX =   387.0 |
|            *  | ST  I80012B50012               |     |  --Z AY =    98.9 |
|DESIGN CODE *  |                                |     |     AZ =    80.0 |
|  IS-800    *  ================================   ===|===  SY = 1694.8 |
|            *                                               SZ =12001.3 |
|            *  |<---LENGTH (ME=     2.55 --->|               RY =    10.5 |
|*************                                               RZ =    35.7 |
|                                                                         |
|                  0.9( KN-METR)                                          |
|PARAMETER       |              L13 L13                     STRESSES     |
|IN   NEWT  MM   |                     L13                  IN   NEWT  MM|
|--------------- +                                          -------------|
| KL/R-Y=   24.3 |L11      L13                              FA  =  147.2 |
| KL/R-Z=    7.1 +                       L13                fa  =    0.3 |
| UNL   = 2545.6 |      L13                            L14  FCZ =  163.4 |
| C     =  180.0 +                                          FTZ =  165.0 |
| CMY   =   0.40 |   L11                    L13             FCY =  165.0 |
| CMZ   =   0.81 +                                          FTY =  165.0 |
| FYLD  =  250.0 |                              L14         fbz =    0.0 |
| NSF   =    1.0 +---+---+---+---+---+---+---+---+---|      fby =    0.0 |
| DFF   =    0.0  0.1                                       FV  =  100.0 |
| dff   =    0.0            ABSOLUTE MZ ENVELOPE            fv  =    0.2 |
|                             (WITH LOAD NO.)                             |
|                                                                         |
|                 MAX FORCE/ MOMENT SUMMARY ( KN-METR)                    |
|                 -------------------------                               |
|                                                                         |
|              AXIAL      SHEAR-Y    SHEAR-Z    MOMENT-Y    MOMENT-Z      |
|                                                                         |
|     VALUE     0.0         0.0        0.0         0.0         0.0        |
|  LOCATION     0.0         0.0        0.0         0.0         0.0        |
|   LOADING      0           0          0           0           0         |
|                                                                         |
|*************************************************************************|
|*                                                                       *|
|*                   DESIGN SUMMARY ( KN-METR)                           *|
|*                   --------------                                      *|
|*                                                                       *|
|*       RESULT/      CRITICAL COND/     RATIO/          LOADING/        *|
|         FX              MY              MZ            LOCATION         |
|        ========================================================        |
|         PASS        IS-7.1.1(A)        0.002             12            |
|        12.22 C          0.0             0.3             2.55            |
|*                                                                       *|
|*************************************************************************|
|                                                                         |
|-------------------------------------------------------------------------|
    262 ST   I80012B50012              (INDIAN SECTIONS)
                  PASS      IS-7.1.1(A)        0.002       12
               12.22 C        -0.03            0.34        2.55
```

Fig 18. Sample member Check of member 262

VII. CONCLUSIONS

It is been observed that the loads on RCC structure are not nominal and cannot be withstand by the existing member and need proper design check of the RCC structural member before installation of telecommunication tower on the existing structure.

Considering the importance of the additional external loads due to telecommunication tower on a building structure, it is been concluded that the design of the columns get effected tremendously hence the telecommunication tower should not be installed on the building which are not designed for such loads.

Further, rooftop towers cannot be based on analytical results obtained for a similar configuration situated at ground level, since the member forces in the tower mounted on rooftop are more than the member forces of tower installed at ground level.

If ever it is been decided to install the telecommunication tower on the existing building, it is essential to check the design of building model with communication tower before installation otherwise structural failure may cause fatality to the victims as the structure is quit heavy and may cause the fatal injury.

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