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Seismic Analysis of RCC and Composite Building in Comparison with Bracing and Shear Wall

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ABSTRACT

This research compares the structural effectiveness of RCC and Composite buildings with and without single diagonal forward encased-bracing and shear wall systems. It has also been looked at how well these three systems work independently on RCC and Composite Buildings. In this research, we use ETABS 2017 software to a seismic analysis of an RCC and Composite building with a G+21 story height. All three of these methods have been used to examine the structural performance of RCC and Composite buildings. Time, Story displacement, Base shear, and Story drift at different locations with single diagonal forward encased-bracing and shear wall are compared for RCC and Composite structures individually. The seismic data was analyzed using linear static and linear dynamic techniques.

Keywords: Shear wall, bracing, storey drift, storey displacement, base shear, ETABS.

1. Introduction

1.1 General

The four most important qualities of a structure are its simplicity and regularity of design, its lateral strength, its hardness, and its stiffness. Buildings with regular geometry in plan and elevation have also fared better than those with more haphazard designs. According to 1893-2002, a structure is disordered if its geometrical features, mass, or load-bearing elements do not match up. Such transgressions may disrupt the steady state tension and force.

First and foremost, structural analysis is concerned with discovering the nature of a structure when subjected to a variety of loads and explosions. When a building is subjected to severe seismic loading, it is important that the structure maintains its equilibrium to prevent unbalanced lateral expansion, an increase in member forces, and the eventual collapse of the building.

Multi-storey symmetric building design and seismic analysis are at the heart of this project. The ETABS program was used to do a structural analysis on the G+21 story RCC symmetrical frame skyscraper. As a result of its height, we classify this building as a multi-story one. Response Spectrum Analysis (RSA) of conventional RC buildings compares well with RSA findings for conventional buildings and has a positive effect on the stability of conventional RC buildings and designing for maximum efficiency.

2. Literature Review

Suryanarayana M

Composite steel concrete is rapidly gaining popularity as a viable substitute for both traditional concrete and steel in building projects throughout the globe. After all, this tactic has never been used in the building industry before.

a) Composite structures had a 31% drop in their base share, while compacted concrete structures saw a 29% drop in theirs, and steel structures saw a 12% drop in theirs.

b) The migration rate for composite structures is up 48% compared to the stable concrete structures and the 49% migration rate for the steel structures.

c) There is more emphasis on the narrative in a steel construction than in an RCC or complicated building.

d) All buildings' currents are far within the allowable range.

e) When compared to RCC and composite structures, column forces are reduced by 48% and 50%, respectively, in a steel building.

f) When comparing composite structures to R.C. and steel structures, beam moments in the composite structures are drastically decreased.

g) Because of the column stresses, the photographs are smaller than those of a conventional reinforced concrete building.

h) Building using composite materials is less expensive than using reinforced concrete.

Syed Hazni Abd Gani and Md. Samdani Azad

The study looked at how shear walls and steel bracing affected how buildings responded to seismic stresses. With the help of the ETABS Software, the behaviour and effectiveness of each model were examined for the shear wall and steel bracing systems. The structure had a 400 square metre floor area, a

24 metre overall height, and a 3 metre floor height. Shear wall thickness is 180 mm, and the PIPESSCH40 bracing pipe profile. The maximum displacement and storey drift of different models have been compared. They have determined that the model with the shear wall in the middle is the safest of all the models they examined.

Shivraj Mangalgi and Umesh R. Biradar

Seven models for various bracing systems are analysed in this paper using linear static and dynamic methods as well as nonlinear static (pushover analysis) and dynamic methods (time history analysis). Every model was created, and ETABS software is used for analysis. The structure is 25m x 20m in size, has 5 bays in both the X and Y directions, and has an 11-story height. Each storey is 3.5mt tall. They came to the conclusion that the IS code does not produce the desired results since the values for the natural time period for bare and braced frames are the same. Using the linear static approach and response spectrum method, they obtained good results for the natural time period. 15.49%, 12.87%, 11.32%, 11.17%, 11.17%, and 4.83% of the time period are cut. Bracing time decrease of 12.87% is seen for X. Therefore, X bracing are favoured in this project over all other varieties.

FazalURahmanMehrabi

When dynamic and gravitational loadings are combined, there is a big displacement, a large amount of moment, and the capacity of the structure is lowered, resulting in increased damage; hence, linear analysis cannot provide useful information. Analysis shows that when a frame is built with a shear wall and bracing, its base share improves in terms of performance.

The use of shear walls in construction and bracing has reduced the structure's natural time of construction and increased its base shears.

Performance metrics and the ability to construct have been improved. The brace and shear wall's alternative loading capacity of 24765.078 KN, 26166.792KN is increased by the OMRF lateral loading of 14646.383KN. Changes in lateral displacement at the effectiveness site decreased from 140.649 mm to 110.78 mm, whereas spectral acceleration rose from 0.119m/s 2 to 0.21mm/sec 2 and then to 0.253m/s^2.

Bhushan O.Dongarwar,DeepaTelang

Adding brackets to a building alters its reaction to seismic activity. In a braced structure, the maximum base share price is higher than in a non-braced one. This is because the building's stiffness has increased as a result of the addition of braced part. The horizontal load at the node is spread out among the beams and columns of the bracket to lessen the joint displacement. As a result of the provided bracing mechanism, the building's turning radius is quite small.

In seismic analysis, all 13 models have the same amount of time required for the braced and unbranded frame construction. Also, the Chevron braced system in appropriate.

Objectives Of Study

3.1 Objectives

1) The Maximum Storey Displacement, Base Shear, and Storey Drift of a Building in a Seismic Event are Being Analyzed.
2) The effects of forward-bracings that consist of a single diagonal and are enclosed in a composite or RC frame are under investigation.
3) Investigating the effects of impact in order to include a bracing into an RC frame structure or Composite building.
4) RC frame structure and Composite building shear wall effect study.
5) Seismic Response of RCC and Composite Buildings.

3.2 Scope of Research

The study's objective is to learn how a single diagonal enclosed forward -bracing, and shear wall system may boost a building's seismic integrity and hardness. It is common practice to utilize a combination of diagonal enclosed forward –bracings and shear wall systems to protect reinforced concrete and composite structures against earthquakes. The primary objective is to learn how a reinforced concrete (RCC) or composite structure reacts after being outfitted with a single diagonal enclosed front bracing and shear wall.

3.3 Methodology

Here, we make an attempt to look at the outcomes of hastily preparing a 3D model of a composite structure and a 2D model of a reinforced concrete building. A multi-story building (G + 21) that complies with R.C.C regulations in terms of both its floor plan and its elevation is the major focus of the research. We will utilize ETABS for the structural analysis of RCC and Composite Buildings. You may then compare factors like the maximum base, the structure's height dislocation, the base share, the narrative drift, and more.

In this case, research was conducted for the management of G+21 story structures; the resulting data established 3.2-meter story heights and identified structural elements. ETABS is used to create the building models. Pin 2 soil with a moderate amount of seismic activity (Part I), and the IS1893-2002 soil type. The ETABS software, which makes use of ESA and RSA, is used for the analysis. We examine several scenarios and statistically find the best way to migrate nodes and divide up the network's resources. The next step is to get a graphical representation of the findings from which inferences may be made.

4. Analytical Modeling

4.1 General

Seismic analysis codes of structure may be used to assess whether a system is irregular or regular. The vast majority of existing code for the intended category suggests using regular construction and linear static analysis. The guideline recommends using dynamic analysis methods if a building has an unusual configuration. However, this variable is typically overlooked in assessments since different codes prescribe different methods for calculating lateral stresses and building the infill wall. This study used a technique similar to seismic analysis to analyze lateral loads. A computer program called ETABS is used for the analysis.

4.2 Description Of Models.

In this research, 6 different models were taken into account.

1. RCC Building (bar frame)
2. RCC Building + Shear Wall in X &Y direction
3. RCC Building + Bracing in X & Y direction
4. Composite Building (bar frame)
5. Composite Building + Shear Wall in X &Y direction
6. Composite Building + Bracing in X &Y direction

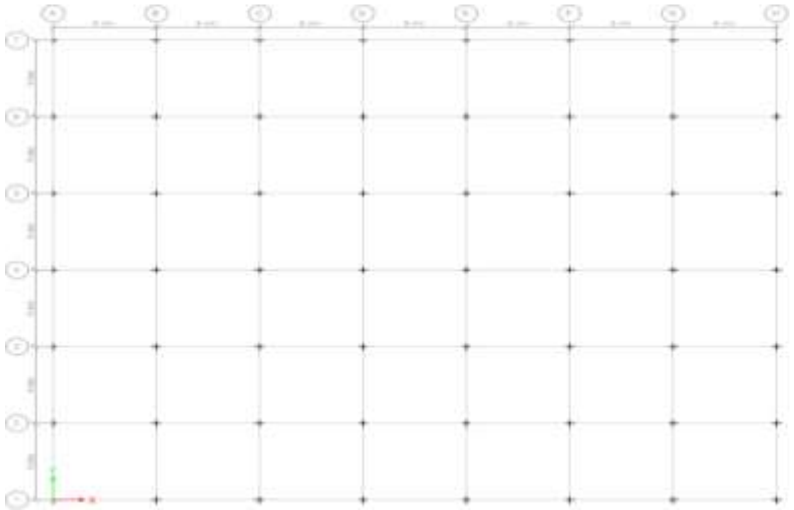


Fig. 1: Building Plan

4.3 Building Details:

Table.1: Building Details

BUILDING TYPE	**RCC BUILDING**	**COMPOSITE BUILDING**
Frame type	Moment resisting frame	Moment resisting frame
Number of stories and building height	22stories69.2m	22stories69.2m
Thickness of wall	230mm	230mm
Live load	2KN/m2	2KN/m2
Concrete grade	M35	M35
Grade of reinforced Steel	Fe550	Fe550
Density of brick masonry	18KN/m3	18KN/m3
Size of columns	C1-650x550mm	C1-500x900mm–ISMB500
Size of beams	B1-350x550mm	B1-ISWB600 B2-350x550mm
Slab thickness	150mm	150mm
Zone	V	V
Soil kind	II	II
Importance factor	1	1
Response reduction	5	5
Seismic zone factor	0.36forzoneV	0.36forzoneV
Dampness proportion	5%	5%

4.4 Modelling Different Models In Etabs Software.

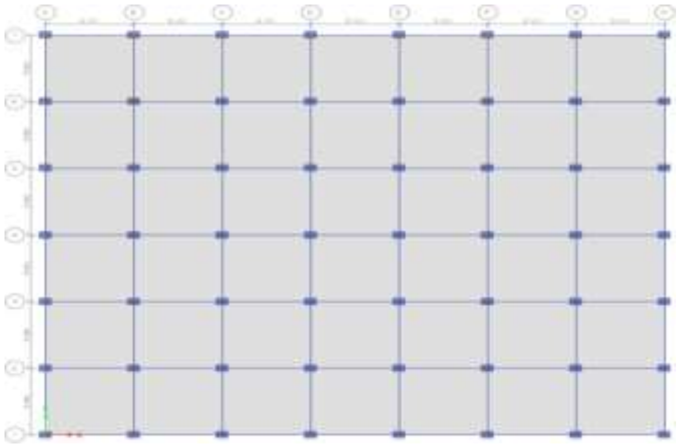


Fig.2: Conventional RCC Building Plan

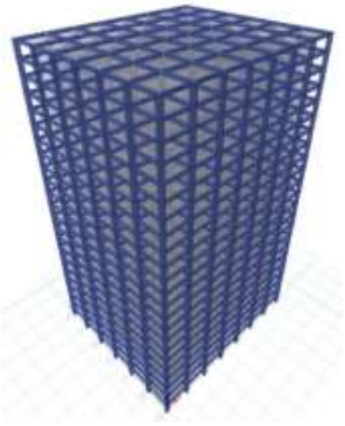


Fig.3: Conventional RCC Building

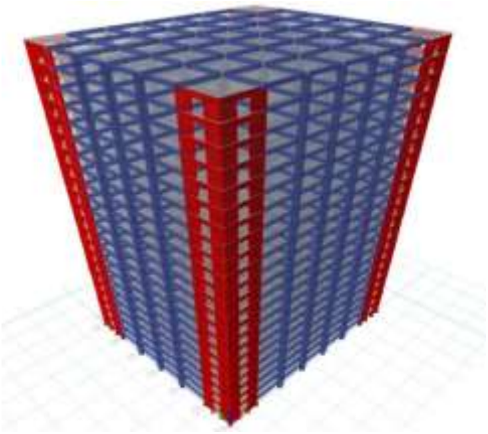
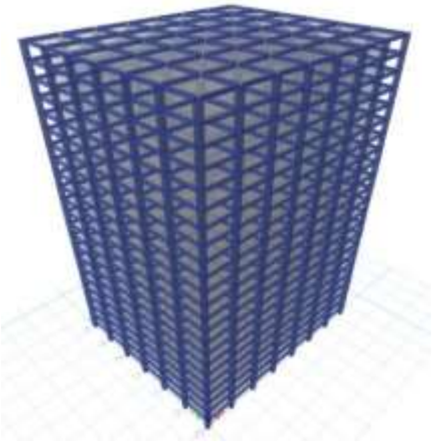


Fig.4: RCC Building + Shear Wall



***F*ig 5: RCC Building + Bracing**

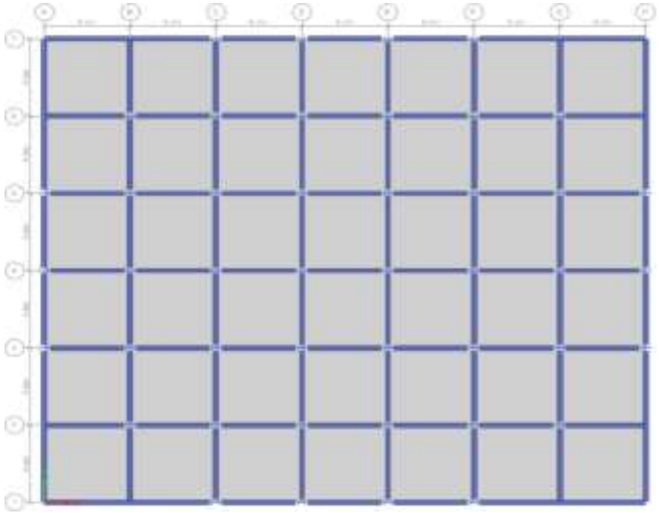


Fig.6: Composite Building

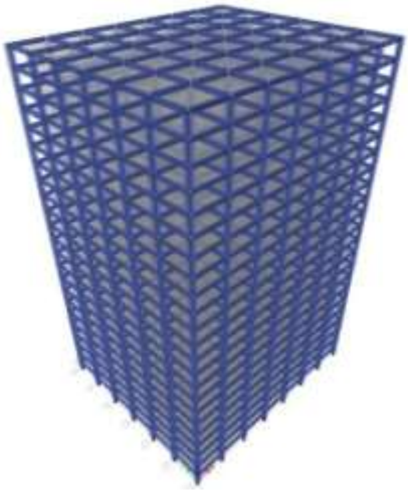


Fig7: Composite Building

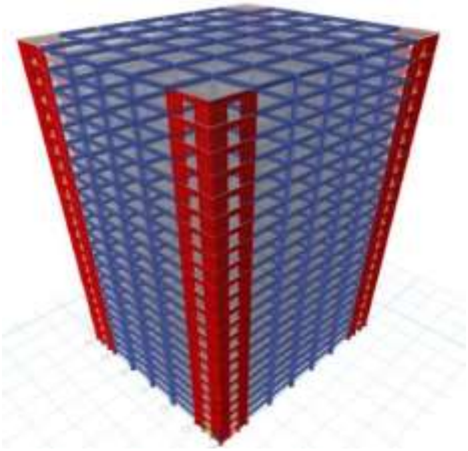


Fig.8: Composite Building + Shear Wall

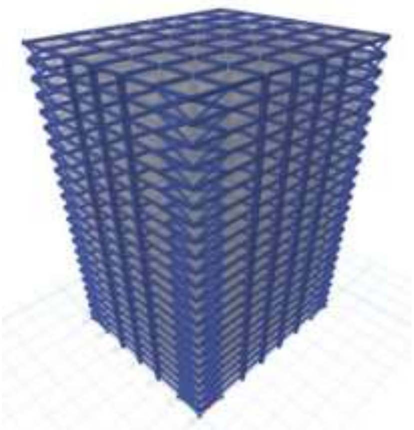


Fig.9: Composite Building + Bracing

5. Results and Discussion

5.1 Time Period

Table 2: Time Period of Various Models

TIME PERIOD IN SECONDS	
MODEL NO.	**TIME PERIOD**
M1	2.532
M2	2.421
M3	2.398
M4	2.519
M5	2.403
M6	2.356

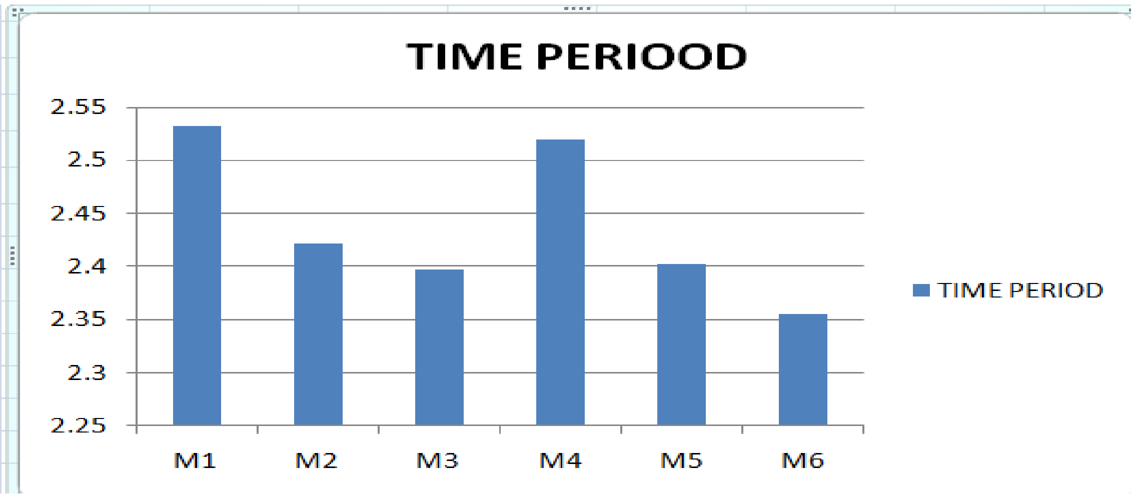


Fig 10: Time Period of various models.

Time interval is T-0.075X(69.2)^ 0.75=1.799 seconds, as per 1893 (PART 1).

In Equivalent Static Analysis according to graph, Model 1 which consists of a bar frame, has the longest Fundamental Time Period, followed by Model 6, which includes bracing and a shear wall, each placed along the X and Y axes independently. For the other models, time reductions occurred with the addition of bracing and shear wall.

Maximum Storey Displacement For Equivalent Static Analysis.

Table 3: Storey displacement of models for ESA

STOREY NO.	**RCC STOREY DISPLACEMENT (mm)**			**COMPOSITE STOREY DISPLACEMENT (mm)**		
	M 1	M2	M3	M4	M5	M6
21	76.214	70.027	82.26	75.772	69.831	82.191
20	75.22	68.035	80.994	74.786	67.835	80.902
19	73.875	65.815	79.375	73.456	65.614	79.263
18	72.131	63.389	77.353	71.733	63.187	77.224
17	69.995	60.745	74.936	69.62	60.545	74.794
16	67.494	57.886	72.147	67.141	57.688	71.994
15	64.661	54.817	69.02	64.331	54.624	68.86
14	61.532	51.552	65.589	61.222	51.365	65.424
13	58.141	48.111	61.891	57.851	47.931	61.724
12	54.522	44.515	57.959	54.25	44.345	57.792
11	50.707	40.791	53.826	50.45	40.631	53.662
10	46.725	36.968	49.525	46.482	36.82	49.366
9	42.603	33.078	45.085	42.372	32.942	44.933
8	38.368	29.155	40.535	38.147	29.032	40.392
7	34.043	25.237	35.902	33.831	25.128	35.77
6	29.651	21.366	31.212	29.445	21.271	31.094
5	25.213	17.587	26.491	25.013	17.508	26.388
4	20.752	13.953	21.767	20.558	13.889	21.681
3	16.298	10.522	17.074	16.113	10.473	17.007
2	11.898	7.363	12.465	11.728	7.329	12.418
1	7.652	4.558	8.037	7.511	4.537	8.011
GF	3.784	2.215	4.009	3.693	2.206	4.002
PL	0.84	0.515	0.905	0.815	0.516	0.908

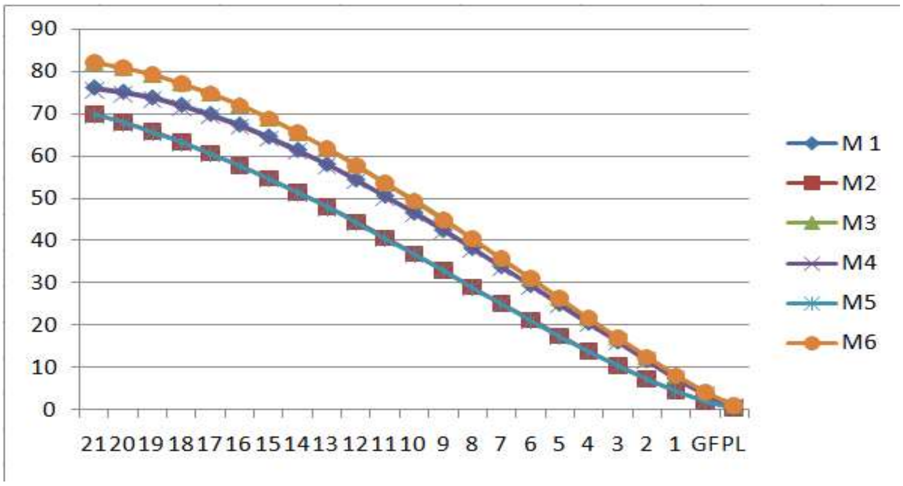


Fig 11: Storey displacement of models for ESA

In Equivalent Static Analysis according to the graph, model 3 has highest value of Storey Displacement whereas model 5 has least value. The Storey Displacement observed in other models varies accordingly as shown in graph.

5.3 Storey Drift For Equivalent Static Analysis.

Table 4: Storey drift of models for ESA.

STOREY NO.	**RCC STORY DRIFT**			**COMPOSITE STORY DRIFT**		
	M1	M2	M3	M4	M5	M6
21	0.000331	0.000664	0.000422	0.000329	0.000665	0.00043
20	0.000448	0.00074	0.00054	0.000443	0.000741	0.000546
19	0.000581	0.000809	0.000674	0.000574	0.000809	0.00068
18	0.000712	0.000881	0.000806	0.000704	0.000881	0.00081
17	0.000834	0.000953	0.00093	0.000826	0.000952	0.000933
16	0.000944	0.001023	0.001042	0.000937	0.001022	0.001045
15	0.001043	0.001088	0.001143	0.001036	0.001086	0.001145
14	0.00113	0.001147	0.001233	0.001124	0.001145	0.001233
13	0.001206	0.001199	0.001311	0.0012	0.001196	0.001311
12	0.001272	0.001241	0.001378	0.001267	0.001238	0.001377
11	0.001327	0.001274	0.001434	0.001323	0.001271	0.001432
10	0.001374	0.001297	0.00148	0.00137	0.001293	0.001478
9	0.001412	0.001308	0.001517	0.001408	0.001303	0.001514
8	0.001442	0.001306	0.001544	0.001439	0.001301	0.001541
7	0.001464	0.00129	0.001563	0.001462	0.001286	0.001559
6	0.001479	0.00126	0.001574	0.001477	0.001255	0.001569
5	0.001487	0.001211	0.001575	0.001485	0.001206	0.001569
4	0.001485	0.001144	0.001564	0.001482	0.001139	0.001558
3	0.001466	0.001053	0.001536	0.001461	0.001048	0.00153

2	0.001415	0.000935	0.001476	0.001406	0.00093	0.001469
1	0.001289	0.000781	0.001343	0.001273	0.000777	0.001336
GF	0.000981	0.000566	0.001035	0.000959	0.000563	0.001031
PL	0.000394	0.000242	0.000424	0.000382	0.000242	0.000426

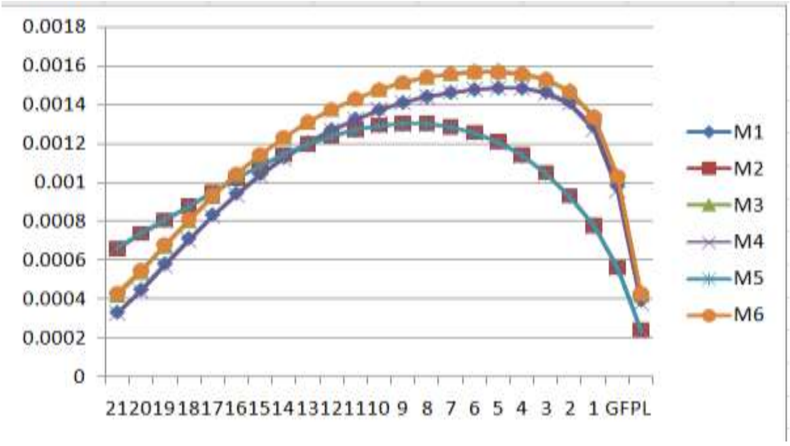


Fig 12: Storey Drift of models for ESA

In Equivalent Static Analysis according to the graph, model 5 has highest value of Storey Drift whereas model 6 has least value. The Storey Drift observed in other models varies accordingly as shown in graph.

5.4 Base Shear For Equivalent Static Analysis.

Table 5 : Base Shear of Various Models.

Model No.	**Base shear**
M1	7325.81
M2	8537.13
M3	6765.11
M4	7406.86
M5	8466.97
M6	6703.75

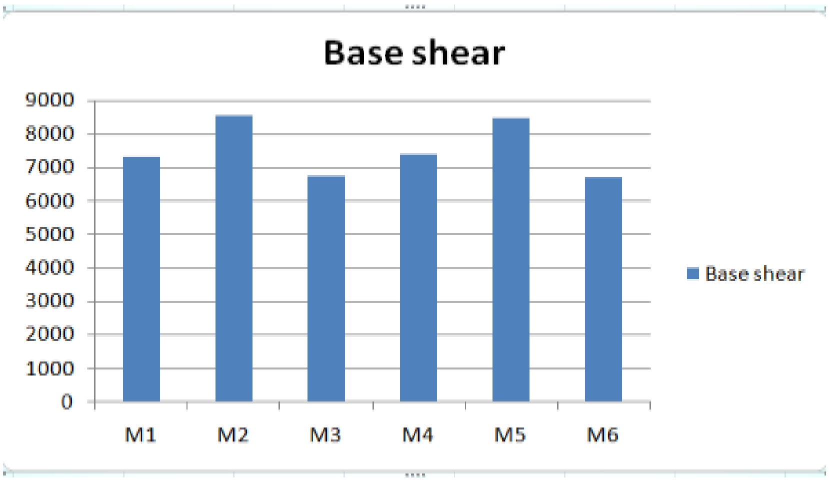


Fig 13: Base Shear of Various Models.

Time interval is T-0.075X(69.2)^ 0.75=1.799 seconds, as per 1893 (PART 1). In Response Spectrum Analysis according to graph Model 2, which consists of a Shear Wall, has the longest Fundamental Time Period, followed by Model 6, which includes bracing and shear wall, each placed along the X and Y axes independently. For the other two models, time reductions occurred with the addition of bracing and shear wall

5.5 Maximum Storey Displacement For Response Spectrum Analysis.

Table 6: Storey displacement models for RSA

STOREY NO.	RCC STOREY DISPLACEMEMT (mm)			COMPOSITE STOREY DISPLACEMENT		
	M1	M2	M3	M4	M5	M6
21	52.0287	45.9029	55.571	51.5593	45.7582	55.5684
20	51.4541	44.6505	54.8196	50.9901	44.5031	54.8025
19	50.6867	43.271	53.8744	50.232	43.1222	53.8434
18	49.6989	41.7811	52.7067	49.2556	41.6317	52.6628
17	48.4924	40.1751	51.3198	48.0613	40.0262	51.2647
16	47.0773	38.4519	49.7228	46.6579	38.3045	49.6579
15	45.4642	36.6121	47.926	45.0554	36.4674	47.8531
14	43.6622	34.6584	45.9384	43.2629	34.5175	45.8592
13	41.6801	32.595	43.7689	41.2888	32.459	43.6852
12	39.5265	30.4273	41.4266	39.1417	30.2974	41.3402
11	37.2098	28.1627	38.9205	36.8297	28.0399	38.8332
10	34.7375	25.8098	36.2589	34.3607	25.6951	36.1725
9	32.1168	23.3795	33.4498	31.7417	23.2737	33.3661
8	29.3546	20.885	30.5012	28.98	20.789	30.422
7	26.4579	18.3431	27.4218	26.0825	18.2573	27.3488
6	23.4326	15.7742	24.2194	23.0551	15.6993	24.1542
5	20.2823	13.2037	20.9	19.902	13.1401	20.8441
4	17.0096	10.6634	17.4688	16.6269	10.6114	17.4238
3	13.6229	8.1939	13.9368	13.2414	8.1535	13.9038
2	10.1523	5.8479	10.3378	9.7821	5.8192	10.3177
1	6.6823	3.696	6.7591	6.3445	3.6785	6.7513
GF	3.4172	1.836	3.409	3.1506	1.8287	3.4111
PL	0.8363	0.4383	0.776	0.7004	0.4387	0.7812

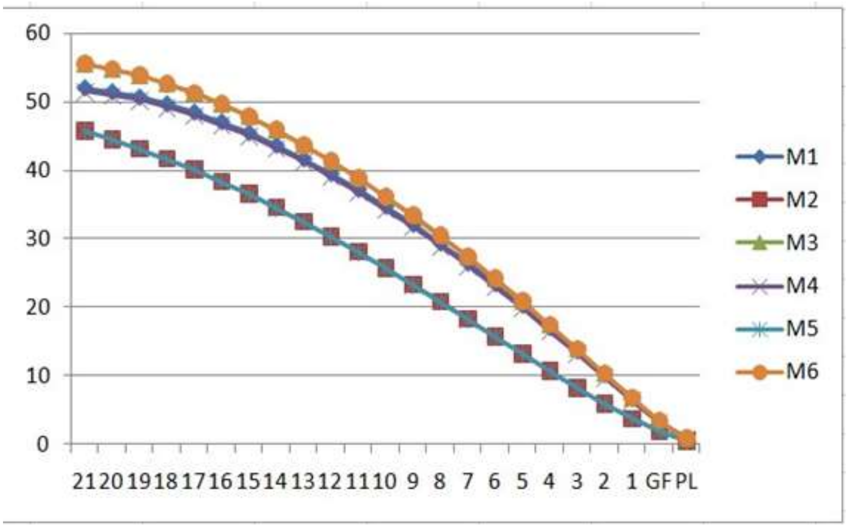


Fig 14: Storey Displacement of models for RSA

In Response Spectrum Analysis according to the graph, model 3 has highest value of storey displacement whereas model 5 has least value. The storey displacement observed in other models varies accordingly as shown in graph.

5. 6 Storey Drift For Response Spectrum Analysis.

Table 7: Storey drift for various models for RSA.

STOREY NO.	**RCC STOREY DRIFT**			**COMPOSITE STOREY DRIFT**		
	M1	M2	M3	M4	M5	M6
21	0.00264	0.004821	0.003272	0.002648	0.004828	0.003312
20	0.003622	0.005413	0.004272	0.003606	0.005415	0.004309
19	0.004641	0.00591	0.005309	0.004607	0.005908	0.005342
18	0.005525	0.006372	0.006199	0.005481	0.006367	0.006228
17	0.006248	0.006784	0.006927	0.0062	0.006775	0.006953
16	0.00685	0.00715	0.007534	0.006803	0.007138	0.007556
15	0.007387	0.007479	0.008077	0.007342	0.007464	0.008094
14	0.007891	0.007777	0.008587	0.007849	0.007758	0.008599
13	0.008369	0.008044	0.009068	0.008332	0.008022	0.009075
12	0.008818	0.008281	0.009514	0.008785	0.008255	0.009516
11	0.009236	0.008484	0.009926	0.009209	0.008456	0.009922
10	0.009632	0.008652	0.010312	0.00961	0.00862	0.010302
9	0.010009	0.008778	0.010676	0.009992	0.008744	0.01066
8	0.010361	0.008853	0.011011	0.010348	0.008817	0.01099
7	0.01068	0.008864	0.011307	0.010669	0.008826	0.01128
6	0.010965	0.008794	0.011559	0.010956	0.008755	0.011528
5	0.011227	0.008625	0.011779	0.011219	0.008585	0.011743
4	0.011473	0.008331	0.011971	0.011456	0.008291	0.011932
3	0.011652	0.007875	0.012088	0.011607	0.007835	0.012045
2	0.011594	0.007198	0.011959	0.011483	0.007161	0.011918
1	0.010889	0.006209	0.011173	0.010651	0.006175	0.01114
GF	0.008603	0.00466	0.008777	0.008168	0.004635	0.008767
PL	0.003919	0.002054	0.003637	0.003283	0.002056	0.003662

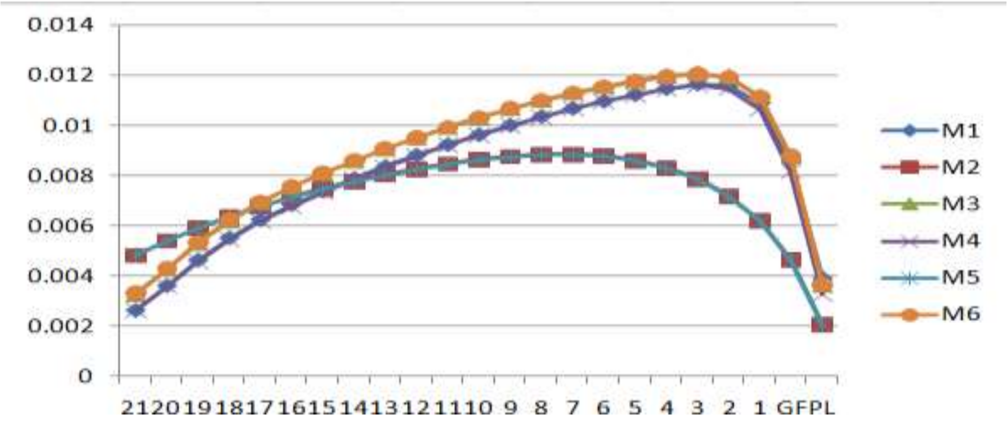


Fig 15: Storey drift for various models

In Response Spectrun Analysis according to the graph, model 5 has highest value of storey drift whereas model 1 has least value. The storey drift observed in other models varies accordingly as shown in graph.

5.7 Base Shear For Response Spectrum Analysis

Table 8 Base Shear For Various Models For RSA

BASE SHEAR KN/m	
M1	8629.37
M2	9765.32
M3	7329.58
M4	8745.65
M5	9978.28
M6	7133.46

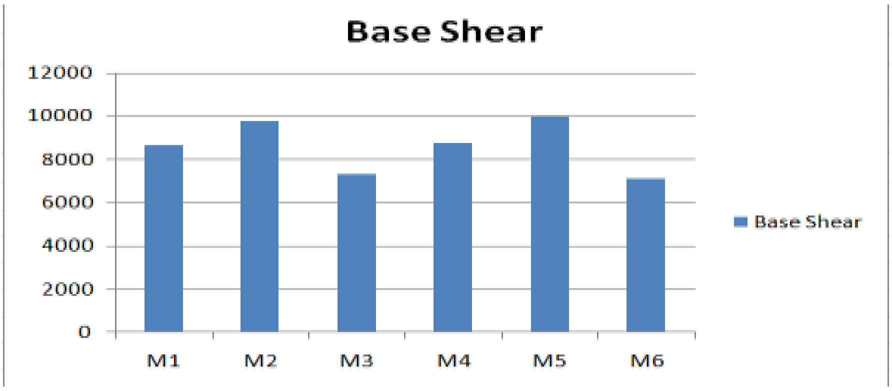


Fig 16: Base shear of various models

5.8 Comparison Of Equivalent Statican Alaysis And Response Spectrum Analysis With Models:

5.8.1 The Storey Displacement Results Are As Follows:

Table 9: Maximum Storey displacements of models for ESA and RSA

MODEL NO.	**EQUIVALENT STATIC ANALYSIS (mm)**	**RESPONSE SPECTRUM ANALYSIS (mm)**
M1	76.214	52.0287
M2	70.027	45.9027

M3	82.26	55.571
M4	75.772	51.5593
M5	69.831	45.7582
M6	82.191	55.5684

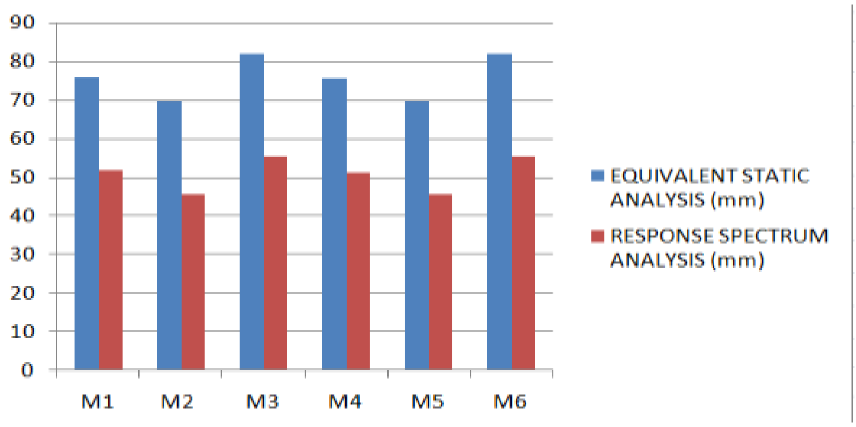


Fig 17: Maximum Storey Displacement of Models for ESA and RSA

5.8.2 The Storey Drift Results Are As Follows:

Table 10: Maximum Storey Drift of models for ESA and RSA

MODEL NO.	EQUIVALENT STATIC ANALYSIS (mm)	RESPONSE SPECTRUM ANALYSIS (mm)
M1	0.00331	0.00264
M2	0.000664	0.004821
M3	0.000422	0.003272
M4	0.000329	0.002648
M5	0.000665	0.004828
M6	0.00043	0.003312

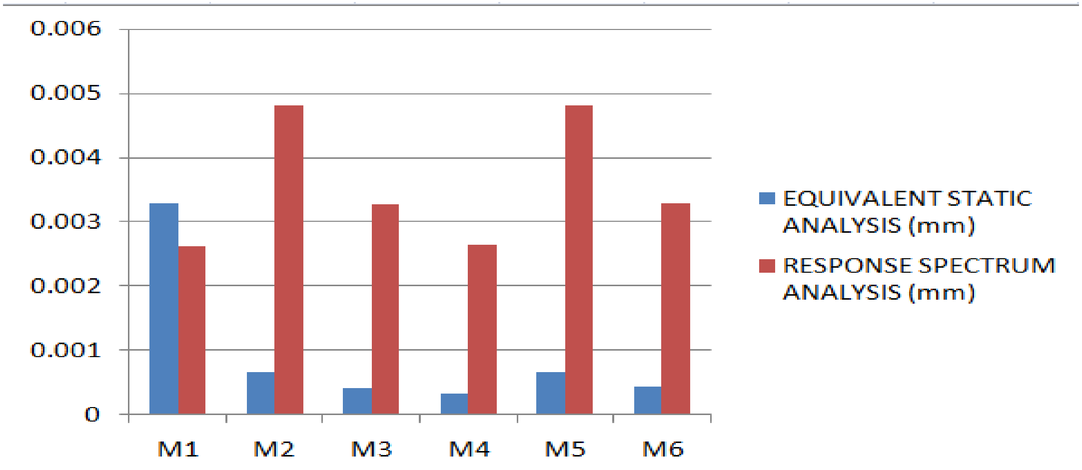


Fig 18: Maximum Storey Drift of models for ESA and RSA

5.8.3 Base Shear Results Are As Follows:

Table 11: Maximum Base Shear of models for ESA and RSA

MODEL NO.	EQUIVALENT STATIC ANALYSIS (mm)	RESPONSE SPECTRUM ANALYSIS (mm)
M1	7325.81	8629.37
M2	8537.13	9765.32
M3	6765.11	7329.58
M4	7406.86	8745.65
M5	8466.97	9978.28
M6	6703.75	7133.46

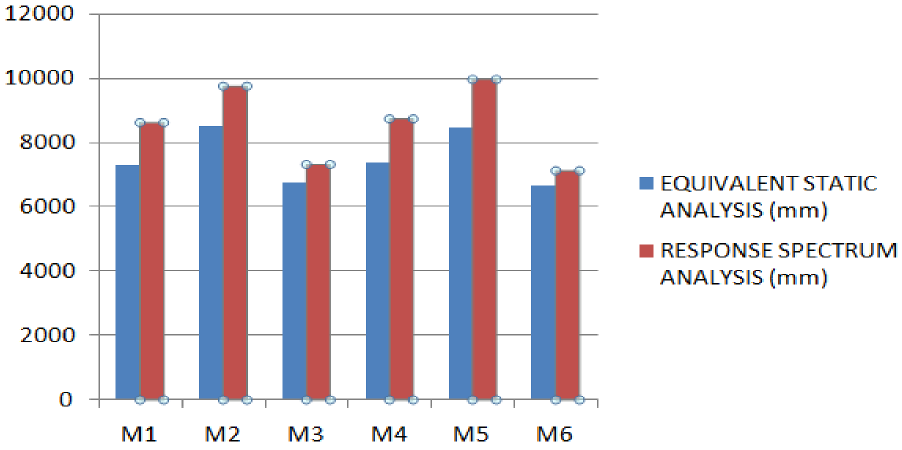


Fig 19: Base Share of models for ESA and RSA

6. Summary and Conclusions

6.1 Summary

The purpose of this work is to investigate the seismic behavior of RCC and composite structures in earthquake-prone areas. The fifth objective is to examine the longitudinal and transverse effects of a single diagonally enclosed front bracing and shear wall system. To do this, we use the same static & response spectrum approaches to compare the models over time, location, story drift, and axis shear. The results of the study are detailed below.

6.2 Conclusions

1. Time period is longest for model 1(RCC building bar frame), while it is reduced by 10.4% for model 2 (RCC building + shear wall). Comparing model 3 (RCC building + Bracing) to model 1 the time period is further decreased by 10.55%.
2. In comparison to models the time period is longest for model 4 (Composite building bar frame) while it is decreased by 10.48% for model 5 (Composite building + Shear Wall). Comparing model 6 (Composite building + Bracing) to model 4, the time period is further decreased by 10.68%.
3. The RCC model 3 (RCC building + Bracing) has the highest storey displacement, however the storey displacement is lower for model 1 (RCC building bar frame) compared to model 3 (10.7%). Comparing Model 2 (RCC building + Shear Wall) to Model 3 the storey displacement is further decreased by 11.74% in Equivalent Static Analysis.
4. Storey Displacement is largest for model 6 (Composite building + Bracing,) while it is reduced by 10.7% for model 4 (Composite building bar frame), when compared to model 6. When comparing Model 5 (Composite building + Shear Wall) to model 6 the storey displacement is further decreased by 11.76%. in Equivalent Static Analysis.
5. The RCC model 2 (RCC building + Shear wall) has the highest storey drift, however the storey drift is lower for model 1 (RCC building bar frame) compared to model 2 (15.7%). Comparing Model 3 (RCC building + Bracing) to Model 2 the storey drift is further decreased by 20% in Equivalent Static Analysis.
6. When compared to model 4 (Composite building bar frame), the storey drift is reduced by 20.2%, whereas it is highest for composite model 5 (Composite building + Shear Wall). For model 6 (Composite building + Bracing) the storey drift is further decreased by 15.46% when compared to model 5 for equivalent static analysis.
7. The Base Shear is highest for the RCC model 2 (RCC building + Shear wall), whereas the base shear is reduced to 11.65% for model 1 (RCC building bar frame) compare to model 2. The base shear is further reduced by 12.62% for model 3 (RCC building + Bracing) compare to model 2 for Equivalent Static Analysis.

8. The Base Shear is highest for the model 5 (Composite building + Shear wall), whereas the base shear is reduced to 11.43% for model 4 (Composite building bar frame) compare to model 5.The base shear is further reduced to 12.6% for model 6 (Composite building + Bracing) compare to model 5 for Equivalent Static Analysis.
9. The RCC model 3 (RCC building + Bracing) has the maximum storey displacement, whereas the storey displacement of model 1 (RCC building bar frame) is lower, at 10.6%, than that of model 3. When compared to model 3 (RCC building + Shear Wall) the Storey Displacement for model 2 is further decreased to 12.1% for Response Spectrum Analysis.
10. In contrast to model 6(Composite building + Bracing) which has the highest storey displacement, model 4 (Composite building bar frame) which has a lower storey displacement of 10.77%, than that of model 6.When compared to model6 (Composite building + Shear Wall) the Storey Displacement for model 5 is further decreased by 12.14% for Response Spectrum Analysis.
11. The RCC model 2 (RCC building + Shear wall) has the highest storey drift, whereas the storey drift is lower for model 1 (RCC building bar frame) compared to model 2 (18.2%). In comparison to model 2 (RCC building + Bracing) the storey drift is further decreased to (14.7%) for model 3 for Response Spectrum Analysis.
12. When compared to model 4(Composite building bar frame) the storey drift for composite model 4 is reduced to 18.23%, while it is highest for composite model 5 (Composite building + shear wall). For model 6 (Composite building + Bracing) compared to model 5, the Storey drift is further decreased by 14.57% for Response Spectrum Analysis.
13. The RCC model 2 (RCC building + Shear wall) has the highest Base Shear, whereas the base shear for model 1 (RCC building bar frame)) is reduced to 11.31% when compared to model 2. For model 3(RCC building + Bracing) the base shear is further decreased to 13.3% compared to model 2 for Response Spectrum Analysis.
14. The Base Shear is highest for the model 5 (Composite building + Shear Wall),whereas the base shear is reduced to 11.4% for model 4 (Composite building bar frame) compare to model 5. The base shear is further reduced to 13.9% for model 6(Composite building + Bracing) compare to model 5 for Response Spectrum Analysis

6.3 Scope For Future Study.

For further studies of medium- to high-rise structures in hilly urban areas, it is possible to install various concrete lines at various heights. By providing a Shear wall and a braced frame, researchers are able to perform their studies with the knowledge that both components are intended to account for the lateral interaction between the two. Withstand the combined force of the design as determined by the hardness ratio.

Additionally, the structure and operation of different dumping systems may be investigated.

Modeling a building equipped with a foundation isolation system is another option for doing the research.

Buildings situated on sloping terrain, where an extra short column impact is shown might benefit from the same analysis.

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