



(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.699

Volume 14, Issue 6, June 2025

⊕ www.ijirset.com 🖂 ijirset@gmail.com 🖄 +91-9940572462 🕓 +91 63819 07438





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406132|

Dynamic Response of Building with RCC and AAC Infill Wall

Vaishali Nagargoje^{1*}, Prof. (Dr).U. R. Kawade^{2*}

PG Student, Dept. of Civil Engineering, Dr. Vithalrao Vikhe Patil College of Engineering, Ahmednagar, India^{1*}

Professor, Dept. of Civil Engineering, Dr. Vithalrao Vikhe Patil College of Engineering, Ahmednagar, India^{2*}

ABSTRACT: The rapid growth of urban population and limitation of available land, scarcity and high cost of available land, the taller structures are preferable now days. The tallness of a building is relative and cannot be defined in absolute terms either in relation to height or the number of stories. But, from a structural engineer's point of view the tall building or multistoried building can be defined as one that, by virtue of its height, is affected by lateral forces due to wind or earthquake or both to an extent that they play an important role in the structural design. Tall structures have fascinated mankind from the beginning of civilization. In many cases, the existing concrete skeleton is stiffened by filling in the space between the beams and columns with masonry of cast-in-place concrete. These infill walls can be a cost- effective method of increasing the lateral strength and rigidity of the building.

KEYWORDS: Infill Wall, Dynamic , Etabs , AAC , RCC.

I. INTRODUCTION

The infill wall is the supported wall that closes the perimeter of a building constructed with a three-dimensional framework structure (generally made of steel or reinforced concrete). Therefore, the structural frame ensures the bearing function, whereas the infill wall serves to separate inner and outer space, filling up the boxes of the outer frames. The infill wall has the unique static function to bear its own weight. The infill wall is an external vertical opaque type of closure. With respect to other categories of wall, the infill wall differs from the partition that serves to separate two interior spaces, yet also non-load bearing, and from the load bearing wall. The latter performs the same functions of the infill wall, hygro-thermically and acoustically, but performs static functions too.

The use of masonry infill walls, and to some extent veneer walls, especially in reinforced concrete frame structures, is common in many countries. In fact, the use of masonry infill walls offers an economical and durable solution. They are easy to build, attractive for architecture and has a very efficient cost-performance. Today, masonry enclosures and partition walls are mainly made of clay units, but also aggregate concrete units (dense and lightweight aggregate) and autoclaved aerated concrete units are used. More recently, industry is also trying to introduce wood concrete blocks. Partition walls, made with both vertically and horizontally perforated clay blocks. [7]

Generally masonry walls are provided in multistory RCC buildings for functional and architectural requirements. It has been accepted that infill materials significantly effects on the seismic performance of the in filled framed structures. Generally infill frames consisting of RCC frame with different infill materials are used. It is generally considered as nonstructural part. But infill walls provide stiffness to the structures, and infill wall improves the seismic behavior of structures. The opening provided in the masonry infill wall reduces the lateral strength of the structures. Because of infill materials building improves resistance of lateral load. Therefore infill wall plays vital role in structural action. In the present study infill materials considered for seismic analysis of multistory building are Clay bricks, RCC, Cement bricks.

IJIRSET©2025





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406132|



Fig 1 Infill Wall.

II. PROBLEM STATEMENT

In this study comparison of L shaped multistory building without infill wall and with infill wall under seismic forces is done. Here a building with plan area of 60m x 60m, column spaced at 5m from center to center in x-direction, 5m from center to center in y-direction, having each storey height as 3.2 m is taken for analysis.

Table 1 Model Parameters

Sr. No.	Parameter	Values			
1.	Number of storey	L shape of G+7 , G+13 , G+20			
2.	Base to plinth	1.5m			
3.	Floor height	3.2m			
4.	Infill wall	M20, 150 mm thick			
5.	Materials	Concrete M30 and Reinforcement Fe 500, AAC			
6.	Frame size 60m X 60m building size				
7.	Grid spacing	5 m grids in X-direction and Y-direction.			
8.	Size of column	300 mm x 500 mm			
9.	Size of beam	300mm x 200 mm			
10.	Depth of slab	200 mm			

Table 2 Infill wall Material property

Property	M20 RCC	AAC
Compressive Strength MPa	20	3
Tensile Strength N/MM ²	2.2	0.86
Modulus of Elasticity KN/mm2	30	10.4

III. METHODOLOGY

The project study involved two stages. The primary data was gathered through a Literature survey targeted by web searches and review of eBooks, manuals, codes and journal papers. After reviewing the problem statement is defined and model preparation is taken up for detail study and analysis purposes. This project execution follows the flow chart given below: The following flow chart describes the layout of this project briefly.

| An ISO 9001:2008 Certified Journal |





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406132|



Table 3 Modelling In ETABS

MODEL 1 – G+7	With RCC and AAC Infill wall and without infill	Zone III & Zone IV
MODEL 2 - G+13	With RCC and AAC and without infill	Zone III & Zone IV
MODEL 3 - G+20	With RCC and AAC and without infill	Zone III & Zone IV





Fig 3 G+13 Building





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406132|



Fig 4 G+20 Building

IV. RESULTS AND ANALYSIS

Results Foe G+7

Table 4 Storey Drift EQX G+7

	ZONE III			ZONE IV		
Story	NORMAL	AAC INFILL	RCC INFILL	NORMAL	AAC INFILL	RCC INFILL
9	0.272	0.26112	0.25024	0.408	0.39168	0.37536
8	0.449	0.43104	0.41308	0.673	0.64608	0.61916
7	0.588	0.56448	0.54096	0.882	0.84672	0.81144
6	0.687	0.65952	0.63204	1.03	0.9888	0.9476
5	0.752	0.72192	0.69184	1.127	1.08192	1.03684
4	0.788	0.75648	0.72496	1.181	1.13376	1.08652
3	0.798	0.76608	0.73416	1.198	1.15008	1.10216
2	0.727	0.69792	0.66884	1.091	1.04736	1.00372
1	0.254	0.24384	0.23368	0.382	0.36672	0.35144



Graph 1 Storey Drift EQX G+7

15966





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406132|

In the above graph shows results for Storey Drift EQX of the G+7 building with RCC and AAC infill conditions for each storey, outcomes compare for zone III and zone IV. From the graph its conclude that RCC infill have less Drift than AAC and without infill building in both zone by 10-15%.

Results Foe G+13

Table 5 Storey Drift EQX G+13

	ZONE III			ZONE IV		
Story	NORMAL	AAC INFILL	RCC INFILL	NORMAL	AAC INFILL	RCC INFILL
15	0.238	0.22848	0.21896	0.357	0.34272	0.32844
14	0.353	0.33888	0.32476	0.530	0.5088	0.4876
13	0.459	0.44064	0.42228	0.689	0.66144	0.63388
12	0.550	0.528	0.506	0.824	0.79104	0.75808
11	0.624	0.59904	0.57408	0.936	0.89856	0.86112
10	0.684	0.65664	0.62928	1.026	0.98496	0.94392
9	0.730	0.7008	0.6716	1.095	1.0512	1.0074
8	0.764	0.73344	0.70288	1.146	1.10016	1.05432
7	0.787	0.75552	0.72404	1.181	1.13376	1.08652
6	0.801	0.76896	0.73692	1.201	1.15296	1.10492
5	0.805	0.7728	0.7406	1.208	1.15968	1.11136
4	0.803	0.77088	0.73876	1.204	1.15584	1.10768
3	0.791	0.75936	0.72772	1.186	1.13856	1.09112
2	0.710	0.6816	0.6532	1.064	1.02144	0.97888
1	0.247	0.23712	0.22724	0.371	0.35616	0.34132



Graph 2 Storey Drift EQX G+13





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406132|

In the above graph shows results for Storey Drift EQX of the G+3 building with RCC and AAC infill conditions for each storey, outcomes compare for zone III and zone IV. From the graph its conclude that RCC infill have less Drift than AAC and without infill building in both zone by 10-25%.

Results Foe G+20

Table 6 Storey Drift EQX G+20

	ZONE III			ZONE IV		
Story	NORMAL	AAC INFILL	INFILL	NORMAL	AAC INFILL	INFILL
22	0.269	0.25824	0.253	0.404	0.38784	0.380
21	0.347	0.33312	0.326	0.520	0.4992	0.489
20	0.425	0.408	0.400	0.638	0.61248	0.600
19	0.497	0.47712	0.467	0.746	0.71616	0.701
18	0.562	0.53952	0.528	0.843	0.80928	0.792
17	0.618	0.59328	0.581	0.928	0.89088	0.872
16	0.668	0.64128	0.628	1.002	0.96192	0.942
15	0.710	0.6816	0.667	1.065	1.0224	1.001
14	0.745	0.7152	0.700	1.118	1.07328	1.051
13	0.774	0.74304	0.728	1.161	1.11456	1.091
12	0.797	0.76512	0.749	1.196	1.14816	1.124
11	0.814	0.78144	0.765	1.221	1.17216	1.148
10	0.826	0.79296	0.776	1.238	1.18848	1.164
9	0.832	0.79872	0.782	1.248	1.19808	1.173
8	0.834	0.80064	0.784	1.251	1.20096	1.176
7	0.831	0.79776	0.781	1.247	1.19712	1.172
6	0.825	0.792	0.776	1.237	1.18752	1.163
5	0.814	0.78144	0.765	1.222	1.17312	1.149
4	0.801	0.76896	0.753	1.201	1.15296	1.129
3	0.780	0.7488	0.733	1.171	1.12416	1.101
2	0.695	0.6672	0.653	1.042	1.00032	0.979
1	0.241	0.23136	0.227	0.362	0.34752	0.340



Volume 14, Issue 6, June 2025



www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|





In the above graph shows results for Storey Drift EQX of the G+20 building with RCC and AAC infill conditions for each storey, outcomes compare for zone III and zone IV. From the graph its conclude that RCC infill have less Drift than AAC and without infill building in both zone by 10-15%

V. CONCLUSION

Ratio of displacement of two consecutive floors to height of that floor. It is very important term used for research purpose in earthquake engineering, So we also studied the level of the expected infills damage based on the analysis of storey drift. After the analyzing RCC and AAC infill models of G+7, G+13 and G+20 for zone III and zone IV. Results are comparing with normal without infill building, AAC infill building and RCC infill building. The results for Storey drift of RCC model are decrees than AAC infill and normal building by around 15-20%

The influence of masonry and RCC infill on the response of multi-storied building under seismic loading is illustrated through typical examples. The presence of masonry infill panels modifies the structural force distribution significantly. The RCC and AAC infill wall for G+7, G+13 and G+20 RC frame structures was performed in this analysis. The report finding is that the RCC infill wall has economic effects than both other cases. The conclusion are based on results of story displacement, storey drift and Base shear for both X and Y Direction.

REFERENCES

- [1] Sharad P. Desai, Swapnil B. Cholekar, "Seismic Behaviout of Flat Slab Framed Structure With and Without Masonry Infill Wall". Volume 2 Isuue 7, July 2013.
- [2] Kumar Vanshaj, Prof. K Narayan, "Seismic Response of Multistorey Flat Slab Building With and Without Shear Wall", Volume: 04, Issue 11, Nov 2017.
- [3] Uttamasha Gupta, Shruti Rattnapakhe, Padma Gome, "Seismic Behavior of Buildings having Flat Slabs with Drops", Volume2, Issue 10, October 2012.
- [4] C.Rajesh, Dr. Ramancharla Pradeep Kumar, Prof.Suresh zkandru "Seismic Performance of RC Framed Buildings With & Without Infill Walls", Volume 3, Issue 10, October 2014.
- [5] Priyanka Vijaykumar Baheti, D.S.Wadje, G.R.Gandhe "Comparative Seismic Performance of Flat Slab With Peripheral Beam Provided Infill and Shear Wall Panel at Different Heights" Volume 14, Issue 3, May June 2017.
- [6] Ioana Olteanu, Vladut Iftode, Mihal Budescu " Influence of Infill Material on The Overall Behavior of A Reinforced Concrete Frame Structure" Volume 1, Issue 2, November 2013.

IJIRSET©2025





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406132|

- [7] Vishesh P. Thakkar, Anuj K.Chandiwala, Unnati D.Bhagat "Comparative Study Of Seismic Behavior of Flat Slab and Conventional RC Framed Structure" Volume 6, Issue 04, April 2017.
- [8] R.P.Apostolska, G.S.Necevska-Cvetanovska, J.P.Cvetanovska, N.Mircic "Seismic Performance of Flat -Slab Building Structural Systems" Volume 1, Issue 1, October 2008.
- [9] Abhishek Arya, Lovish Pamecha "Seismic Behaviour of Multistorey Buildings Having Different Types of Slabs" Volume III, Issue VII, January 2017.
- [10] Dattatraya L. Bhusnar, Dr. C .P. Pise, D.D. Mohite, Y.P. Pawar, S.S. Kadam. C.M. Deshmukh "Study of Different Infill Material on the Seismic Behaviour of multi-Storey Building With Soft Storey" Volume 5, Issue 12, December 2016.
- [11] Mohd Danish, Zaid Mahamood, Mahamood Shariq, Amjad Masood "Seismic Performance of R.C Buildings With Shear Wall" Volume 1, issue 1, December 2013.
- [12] Shubham Gupta, Lavina Talavale, Utkarsh Jain "Behaviour of Buildings having Flat Slabs Under Seismic Loading" Volume 1, Issue 10, October 2018.
- [13] M.K. Devtale S.S. Sayyed, Y.U. Kulkarni, P.G Chandak "Comparison of Seismic Reponses Between Flat Slab Building and Regular Frame Building" Volume 3, Issue 6, June 2016.
- [14] Dr P. Mallesham, S.B. Sankar Rao, Yerra Saritha "Comparison of Earth Quake Resistant Building With and Without Infill Walls in Zone II and IV Using Etabs" Volume 5, Issue 11, November 2016.
- [15] K. Sarath Kumar, Dr Dumpa Venkateswarlu, Dr D V Rama Murthy "Behaviour of Multi- Storied Flat Slab Building Due to Lateral Forces With and Without Shear Walls" Volume 2, Issue 17, Jan-Mar 2017.
- [16] Baswaraj H S, Rashmi B A "Seismic Performance of RC Flat-Slab Building Structural System" Volume 2, Issue 9, May 2015.
- [17] P.M.B. Raj Kiran Nanduri, B.Suresh, SK. Nagarju, MD. Ihtesham Hussian "Critical Comparison of Flat Plate Multi-storied Frames With and Without R.C Infilled Walls Under Wind and Earthquake Loads" Volume 3, Issue 2, April 2013
- [18] Pradip S. Lande, Aniket B. Raut "Seismic Behaviour of Flat Slab Systems" Volume 2, Issue 10, April -June 2015.
- [19] Renuka Ramteke, Manish Chudare, Amey Khedikar, "Study of Multistoried RCC Flat Slab Structure, Under Seismic Effect" Volume 6, Issue 11, May 2017.
- [20] Dr M Rame Gowda, Techi Tata "Study of Seismic Behaviour of Buildings With Flat Slab" Volume 03, Issue 09, September 2016.
- [21] Santiago Pujol1, Amadeo Benavent-Climent2, Mario E Rodriguez3, and J. Paul Smith- Pardo4 "Masonry Infill walls: An effective alternative for seismic strengthening of low- rise reinforced concrete building structures "The 14th world conference on earthquake engineering, October 12-17,2008, Beijing.
- [22] Elouali T (2008) " Effect of Infill Masonry Panels on the Seismic Response of Frame Buildings" The 14 World Conference on Earthquake Engineering October 12-17, 2008, Beijing, China.
- [23] Shahabodin. Zaregarizi (2008) "Comparative Investigation on using Shear Wall and Infill to Improve Seismic Performance of existing building", The 14 World Conference on Earthquake Engineering October 12-17, 2008, Beijing, China.
- [24] Riza Ainul Hakim (2013), "Seismic assessment of an RC building using pushover analysis", Engineering Technology and applied science research, Volume 4, Issue 3, pp.631-635.
- [25] Mohammed Rizwan Sultan, D. Gouse Peera, "Dynamic analysis of multi-storey building for different shapes. Issue 8, Volume 2 (August 2015)









INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY





www.ijirset.com