Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 7, July : 2024

COMPARATIVE PERFORMANCE EVALUATION OF UNREINFORCED MASONRY(URM)INFILLEDRCFRAMES SUBJECTED TO VARIOUS GROUND MOTIONS USING ETABS AS A TOOL

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ABSTRACT:

Now a day's construction of RC frame structure is common due to the simplicity in construction. Unreinforced Masonry infill walls (URM) tend to be utilized as interior and external partition walls in reinforced concrete (RC) framed constructions. Instead of being utilized for structural purposes, infill walls are often employed for partitioning and insulation. However, during an earthquake, this infill helps the structure respond, and the infill frame building behaves differently from a traditional frame construction. Infill functions between a column and a beam as a compression strut. For this reason, a linear dynamic analysis of an RC frame structure with masonry infill was carried out in order to determine the impact of the structure's strength variations with and without the infill wall as well as the impact of the infill on dynamic parameters such as story displacement, story drift, story shear, hinge status, target displacement, and performance point. The programme ETABS is used as a tool to do all of the analysis and modeling for the G+15 RCC framed construction.

Keywords: *Structural Analysis, Pushover Analysis, maximum storey displacement, Infill walls, Displacement, Storey drift, Stability.*

I. INTRODUCTION

For structural or aesthetic reasons, brick infill's are used in the construction of many structures. However, the combination of brick infill panels is frequently disregarded in the non-linear evaluation of building structures due to the intricacy of the issue and the lack of a realistic, but straightforward analytical model. Such a presumption might result in significant errors when forecasting the structure's lateral stiffness, strength, and ductility. In the last four decades, there has been a lot of research done on the behavior of masonry-in filled frames in an effort to create a logical design process. Because of the principle of cautious design, infill walls' strength and stiffness are often overlooked in Indian design practices. Practically speaking, infill walls provide the structure a significant amount of strength and stiffness, and their absence might lead to the collapse of many multi-story structures. Infill's provide a considerable contribution to the resistance of lateral loads but not to the resistance of gravity loads. In reality, infill stiffness is often disregarded in frame analysis, which underestimates stiffness & natural frequency. The energy dissipation properties of infill's help them be more seismically resistant. Numerous researchers have examined the behavior of infill walls by varying a variety of structural analysis as well as civil engineering parametersand verticals, such as the percentage of infill openings, the presence or absence of infill's, the opening of the first floor, the infill material, the analysis using various software programmes in conjunction with various analytical techniques, etc.

When there are structural defects in the horizontal load-bearing frames of a multi-story framework construction,earthquake damage often beginsthere. The organization ofmass, stiffness, and strength inboth the vertical and horizontal lines of buildings determine how multi-storey framework constructions behave during strong seismic movements. Recent earthquakes, including the 2015 Nepal earthquake, in which multiple reinforced concrete structures were seriouslydamaged or toppled, have raised the idea that existing structures should be evaluated for their seismic compatibility. When there are structural defects in the horizontal load-bearing frames of a multi-story framework construction, earthquake damage often begins there. The mass distribution, stiffness, and strength in both the horizontal and vertical axis of buildings are key factors in how multi-story framework structures respond to significant seismic disturbances.

Toanalyse the skyscraperbyretrofittingmethodsfourmodelsare developedasfollows

ModelI:RCConventionalFramedStructure

A reinforced concrete (RC) framed structure is a common type of building construction that utilizes reinforced concrete members, such as columns, beams, and slabs, to provide structural support and stability.RC framed structures are widely used due to their strength, durability, and versatility. The combination ofreinforced concrete and steel reinforcement provides stability and resilience, making them suitable for avariety of building types and applications. Proper design, construction, and maintenance practices areessential for ensuring the longevity and safety of RC framed structures. The combination of steelreinforcement and concrete offers strength, durability, and flexibility, making RC framed structures widelyused in residential, commercial, and industrial buildings.

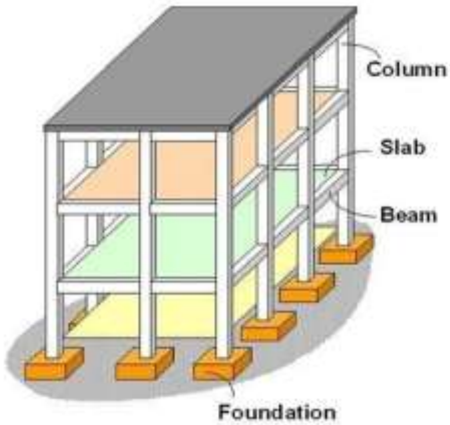


Fig.1RCConventionalstructure

ModelII:URM allStructure

A masonry wall that is erected inside of a structural frame, usually composed of reinforced concrete or steel, is referred to as an unreinforced masonry in filled wall. Non-structural features of the in filled wall include partitioning internal areas and enclosing the building exterior. The brick wall used in this construction approach is not intended to support any sizable lateral or vertical loads. Instead, it depends on the nearby structural framework to provide it the support and stability it needs. In essence, the in filled wall serves as a cladding/ partition wall. It is important to highlight that the abilityof unreinforced masonry infilled walls to withstand lateral or seismic stresses is limited. These walls maybe susceptibleto damage or collapse duringearthquakesor strong wind eventsdue to the absence of reinforcingin the brickwork. Thisis due to masonry's fragility and lack of considerable tensile strength.

These techniques improve the building's overall safety and structural integrity by reducingthe susceptibility of unreinforced masonry in filled walls against seismic and lateral pressures. When developing or retrofitting such walls, it is essential to work with structural experts and comply to local buildingnorms and regulations to guarantee correct construction & adherence to safetyrequirements. Below is a picture of a structure with a URM wall.

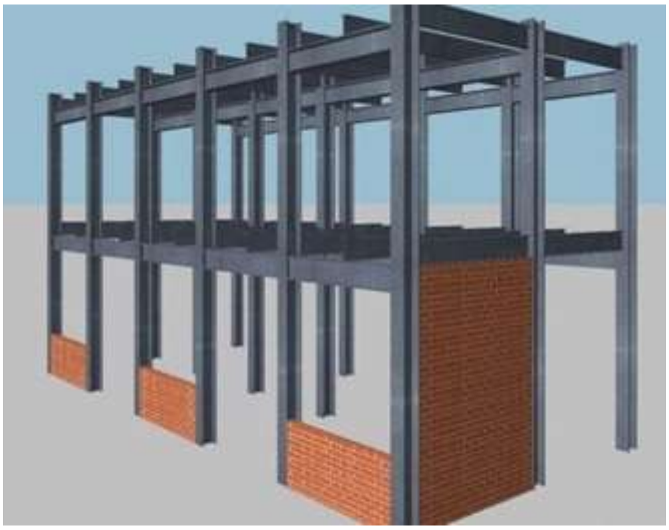


Fig.2 URMwallStructure

II. LITERATUREREVIEW

RC Frame using Brick Masonry Infill Walls Seismic Evaluation. Scholar in M.Tech Nitesh Singh and Associate Professor V.K. Verma Onlyasexteriorwallsandpartitionwallsin RC frame structuresare infill panels employed. These are regarded as non-structural features and may provide the structure a significant amount of stiffness, which enhances how well it responds to underground vibrations. In this study, the Equivalent Lateral Force technique and the Response Spectrum technique are utilized to analyze the behavior of infill walls. One without infill and one with infill are regarded as two models. Using theHendry formula, the one with the infill has been modeled as an analogous diagonal strut element. The Pushover analysis is used to analyze both models. STAAD Pro is the programme utilized, and the findings are contrasted with a bare frame with regard to of strength and stiffness.

AAC & conventional brick infill walls' effects on the seismic performance of RC-framed structuresare compared. Student of M.Tech Kajal Goel The investigation of an RC frame with two distinct infill materialsAAC (Autoclaved Aerated Concrete) and conventional concrete blocksis the subject of this article. STAAD Pro was utilized for analysis in this article. Equivalent Static Force Analysis is the approach utilized in this article. This article compares the two materials using several characteristics, including base shear, end displacement, and frame deflection.

Positive Effect of Masonry Infill Walls on RC Frame Building's Seismic Performance Sudhir K Jain and C V R Murty. Masonry infills significantly increase lateral stiffness, strength, overall ductility, and capacity for releasing energy. It is feasible to enhance the out-of-plane response of such infills by making appropriate arrangements for reinforcement in masonry that is securely fastened to frame columns. Infills prevent the RC frame from deforming laterally; they separate along one diagonal while compression struts develop along another. Infills provide the building more lateral rigidity as a result.

Effect of Infill Stiffness on Indian Multi-Storey RC Framed Buildings' Seismic Performance. Devdas MENON, Meher, Praseetha KRISHNAN, Robin DAVIS PRASAD In India, brick masonryserves as the infill for the majority of reinforced concrete-framed multi-story structures. Unreinforced masonry infillwalls won't necessarily help the structure withstand gravity loads, but they may greatly improve the structure's stiffness and strength in the event of an earthquake or a windstorm, which might lead to an underestimation of the structure's stiffness and natural frequency. Experiments have shown that infills have dissipation of energy qualities that help to increase earthquake resistance. In this essay, two typicalstructures in India's moderate seismic regions are taken into consideration. The distinction between two buildings is that one has a symmetrical design while the other has a layout with vertical irregularity (soft- storey). Modelling of the infills was done using an analogous strut technique. In order to assign the hinge characteristics to the beam and column sections, static analysis (for gravity alongside lateral loads), reaction spectrum analysis, and non-linear pushover analysis were carried out. When infill stiffness is taken into account, it is shown that the seismic demand at the soft storeylevel is substantially higher, with bigger base shear and larger displacements. However, in the symmetric building (without soft story), this impact is not observed to be substantial. The pushover analysis was used to compare the seismic performance of the two examples. This publication provides a thorough description of the findings.

Highrise Building Earthquake Analysis with and Without Infill Walls. M.R. Wakchaure and S.P. Ped It is well known that stone infill panels affect how RC frames react to seismic activity. This effect has been the focus of countless experimental research, and there have also been multiple efforts to model it analytically. In the study of structures, infill walls are modelled as comparable strut approaches numerous equations for strut width and modelling have been developed byresearchers and scientists. The infill acts as a compression strut between the column and the beam, transferring compression forces from one node to another. This research examines the impact of brick walls on tall buildings. On a high rise building with various arrangements, linear dynamic analysis is done. A G+9 R.C.C.-framed building is modelled for the study. The models are applied to the earthquake time history. The comparable strut technique is used to determine the strut's width. Numerous analysis instances are chosen. The analysis is done entirely by the programme ETABS. For all models, base shear, storey displacement, and story drift are computed and compared.The findings demonstrate thatinfill wallsenhance baseshearwhiledecreasingdisplacementsand time periods. Therefore, it is crucial to take into account the impact of masonry infill when evaluating a moment-resisting reinforced concrete frame for seismic activity.

III. METHODOLOGY

Technique for study purpose various soil circumstances whichever is provided in IS456 in use inETABSprogram. AccordingtoIS456theLight,Medium,RigidStratawithVariablebasesupportsBasedon movement and weight relation optimum construction were determined.

ModellingofStructuralSystems

Basic to ETABS planning is the assumption that multi-story structures usually comprise of the same or comparable floor layouts that recur in the vertical position. Planning characteristics that simplify analytical- model creation, and mimic sophisticated earthquake systems, are enumerated as follows:

- Customizedsectionshapeandintrinsic behaviour
- Groupingof framesaswell as shell elements
- Linkassignmentforsimulatingisolators,dampers,andsome othercomplexearthquake systems
- Nonlinearhingespecification
- Editingandtasktoolsforplan,perspective,and3Dviews

RESPONSESPECTRUMANALYSIS

In accordance with IS-1893:2002, the total sum of the modal masses of all modes taken into consideration for the analysis should be at least 90% of the overall seismic mass.

For structures without any horizontal plan irregularities, ASCE 7-05, a Guide for the Planning of Diaphragms, allows diaphragms of concrete slabs or concrete stuffed metal decks with a span-to-depth ratio of 3:1 to be idealised as rigid otherwise, the structural evaluation shall expressly embody believed of the stiffness of the diaphragm without elaborating. Nasser et al. (1993), Mansur et al. (1999), and Abdalla and Kennedy (1988) provided information on how an opening in rectangular RC and prestressed beams impacts stressdistributionsand a concrete beam's capacityin the field of concrete beamshavingnet openings. Sadly, there was little evidence that the theory was developed to include other configurations; it was just marked against readily available experimental findings.

PUSHOVERANALYSIS:

Buildings sustain crucial inelastic deformation under a powerful earthquake and dynamic characteristics of the structure evolve over time, so analyzing the implementation of a structure needs inelastic science methods depicting these dynamics. Inelastic analytical techniques grasp the people knows of structures by identifying letdown modes as well as the possibility for dynamic breakdown. Inelastic analysis techniques essentiallycombine inelastic analysis of time history as well as inelastic data observed that would otherwise be called pushover analysis.

The elastic - plastic time history study is the most precise method to predict the force and displacement demands at various components of the construction. In any event, the employment of inelastic time history analysis has been limited in due to the fact that dynamic response is exceedingly sensitive to showing and ground movement qualities. Additionally, it needsaccessibilityof an arrayof deputyseismic ground records that tracks for disturbances and differences in severity, regularity and length of time characteristics.

In a sense, the modeling approach in anticipating earthquake requests should be explored for low, intermediateandhighriseconstructionsbydistinguishingcertainconcerns,forinstance,demonstratingnon-linear part conduct, algorithmic fully intend of a method, varieties in the prognostications of different horizontal responsibility designs used during customary pushover analysis, aptitude of conserved parallel burden designs in talking to wave propagation impacts and precise assessment of target upending during which seismic interest assumption of pushover technique is conducted.

OBJECTIVESOFSTUDY

A thorough literature study is carried outside to describe the goals of the thesis. The literature survey is reviewed and quickly outlined as follows:

1. To decide the capacityof URM infilled wall structure compared to conventional reinforced concrete structure as a parallel load opposing individuals.
2. Dynamicinvestigationofthetallframedstructuresconsideringresponsespectrumexamination.
3. Utilization of Advanced diagnostic applications of software like Staad.Pro, Etabs for story response plot examination of horizontal load opposing structure and the inter story displacements.
4. To decide the capacity and dynamic investigation in the terms of maximum story displacement and story drift of the tall framed structure subjecting to IS load combinations.
5. To set up a reference study for the usageofURM infilled wallsin the framed structures accordingcode standards.

IV. BUILDINGMODELLINGANDANALYSIS

For a analysis in ETABS firstly select the material property in define then add the required material which we use in design of G+15 structure. By choosing define option material properties in this case, we had first specified the material property. By providing the necessary information in the defining tab, we introduced new material to make our structural elements (beams, columns, slab, and URM wall). Then, by choosing the frame sections shown below, we defined section size and added the necessary sections for beams, columns, etc.

Buildingtype	G+ 15
Plandimensions	40x30m
No. ofbayinXdirection	8Bays
No. ofbayinYdirection	6Bays

Typicalstoreyheight	3.3m
Bottomstoreyheight	3.0m
Buildingheight	55.8m
Soiltype	Type II(Medium Soils) CombinedorIsolatedRCCfootingswiththe beams
Designcriteria	(AsHeightofbuildingisgreaterthan40mupto90mtype) Analysis for all zones. Modal analysis using Response spectrum methodandfor PerformanceTimehistoryorPush-overanalysisistobe performed for the maximum deformed zone.
Zone considering	II,III, IV&V
ImportanceFactor,I	1
ResponseReductionFactor,R	5 (SMRF) RCBuildingwithSpecialMomentResisting Frame
Performancefactor, K	1.0 (Moment resistant frame with appropriate ductility detailsasgiveninIS:437.6-1976*in reinforced concreter steel)
Support condition ofcolumns	Fixed

Table1:Geometricalproperties&locationfactors

Columnsize	450 x 600 mm
Beamsize	300 x 450 mm
Thicknessofslab	150 mm
Gradeof concrete	M-40
Gradeofsteel	Fe-550
Columnsize	450 x 600 mm

Table2:Section&material properties

Wallloadonexternalbeams	13.11kN/m
Wallloadoninternalbeams	8.55 kN/m
Floorfinishload	1.5 kN/m^2
Liveloadonfloor	2 kN/m^2
Terracefinishload	1.5 kN/m^2
Dead loadfactor	1
Liveload factor	0.25(i.e.,25%)
Loadcombination considering live load	1.2[DL+IL± (EL_X ±0.3 EL_Y)]and 1.2[DL+IL± (EL_Y ±0.3 EL_X)]and

Table3:Loadingdetails

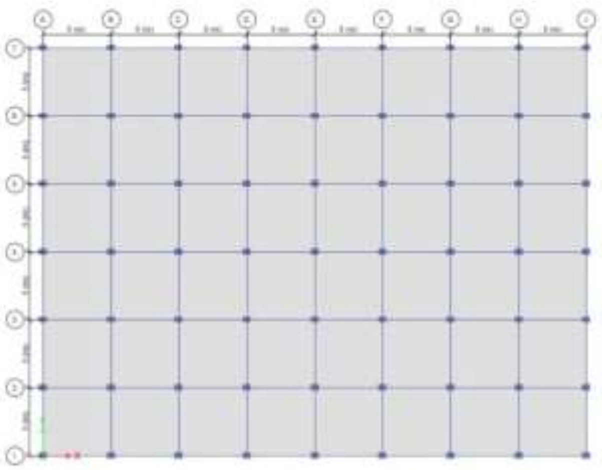


Fig3.PlanLayoutofstructure

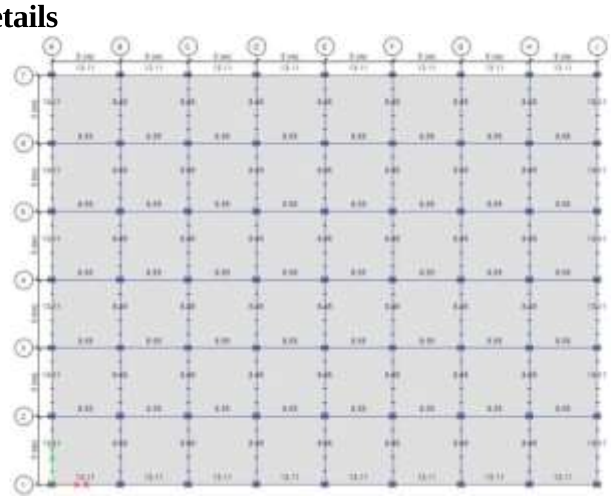


Fig4.DeadLoadon Beams

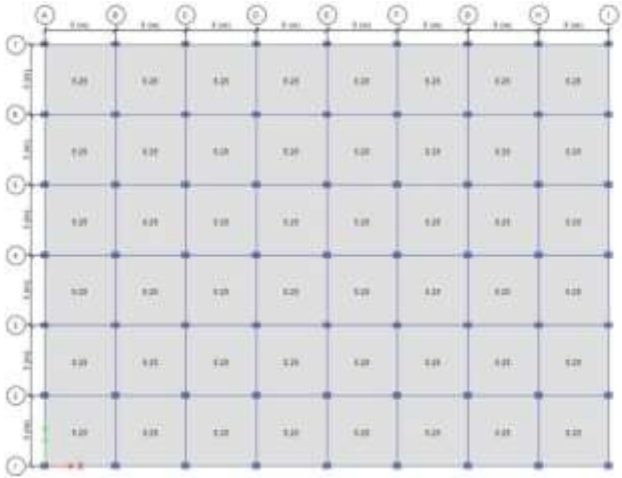


Fig5.DeadLoadonSlab

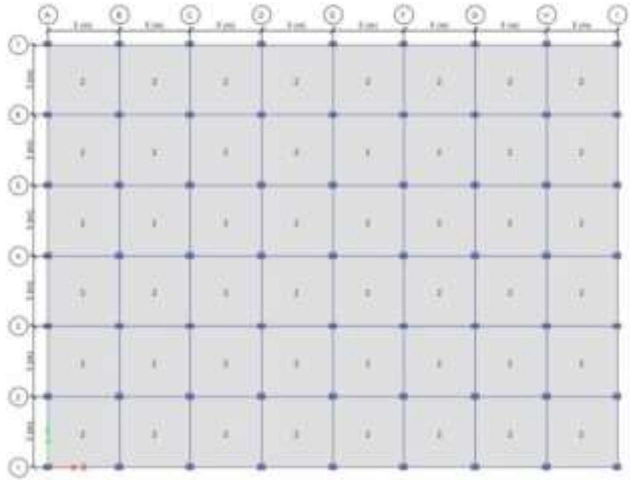


Fig6.Liveloadonslab

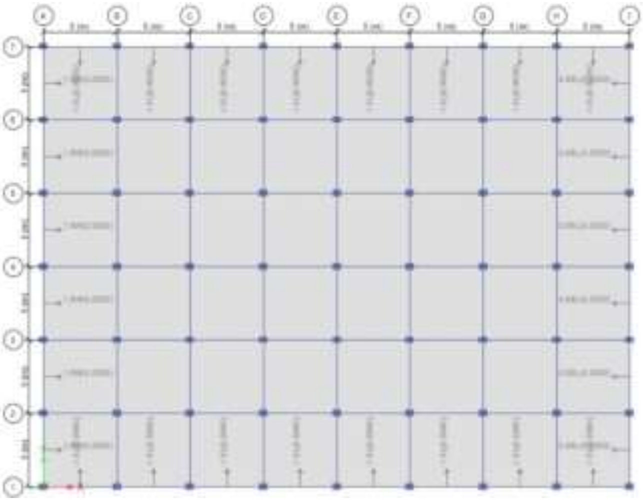


Fig7.Windpressure co-efficient of structure

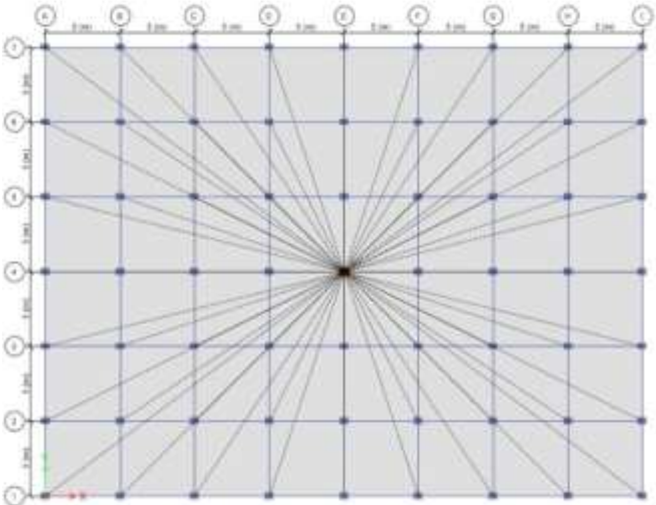


Fig8.DiaphragmProperties

The output and display formats for moment, shear, and axial force diagrams as well as deformed shapes are available after assigning all the properties of beams, columns and slabs and applying loads. These may be arranged into specialized reports and fine-grained section cuts showing different local response measures.

Asper7.9clauseofIS1893 (part1):2016forRCBuildingswithUnreinforcedMasonryInfill Walls

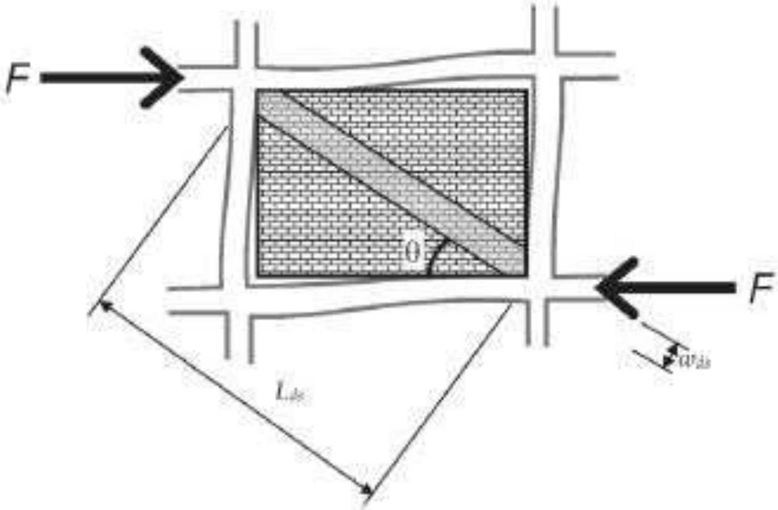


Fig9.EquivalentDiagonalStrut ofURMInfillWall

Compressivestrengthofconcretef_{ck}=40N/mm^2

ModulusofElasticityE_f=5000$\sqrt{f_{ck}}$=31622.777N/mm^2 Compressive strength of brick f_b = 10.5 N/mm^2

Compressivestrengthofmortarf_{mo}=53N/mm^2(as53 grade cement issuedwidely)

Compressivestrength ofmasonryprism f_m= 0.433 $f_b^{0.64} f_{mo}^{0.36}$

$$f_m = 0.433\ (10.5)^{0.64}(53)^{0.36}$$
$$= 0.433 \times 4.504 \times 4.176$$
$$= 8.144\ \text{N/mm}^2$$

ModulusofelasticityofURM InfillwallE$_m$=550f$_m$=550x8.144=4479.2N/mm^2 Story Height = 3300 mm

Bay Length = 5000 mm

ColumnSize=450x600mm

Beam size = 300x450 mm

HeightofInfill(h)=3300-450=2850mm

LengthofInfill(l)=5000-600=4400mm Thickness of Infill (t) = 230 mm

Moment of Inertia of adjoining column (I_c) = $\frac{450x600^3}{12}$ = 0.0081 m^4 = 81,00,000,000 mm4

$\theta = \tan^{-1}\frac{h}{l} = \tan^{-1}\frac{2850}{4400} = 32.932$

L_{ds} = h/sin θ = 2850/sin32.932 = 5242.408 mm

Putting above values in the equation,

$$\alpha_h = h\left(\sqrt[4]{\frac{E_m\, t\, \sin 2\theta}{4\, E_f\, I_c\, h}}\right) = 2850\left(\sqrt[4]{\frac{4479.2*230*\sin(2*32.932)}{4*31622.777*8100000000*2850}}\right) = 2.146$$

$W_{ds} = 0.175\ \alpha_h^{-0.4}\ L_{ds}$

W_{ds} = 675.954 mm (taken 600 mm)

Thickness of URM infill wall taken as wall thickness i.e., 230 mm

ThicknessofURMinfillwalltakenaswallthicknessi.e.,230mm

From the above we have takenthe dimensionsofURMinfill equivalent diagonal OfURMinfillwall as 230 mm width to 600 mm as depth.

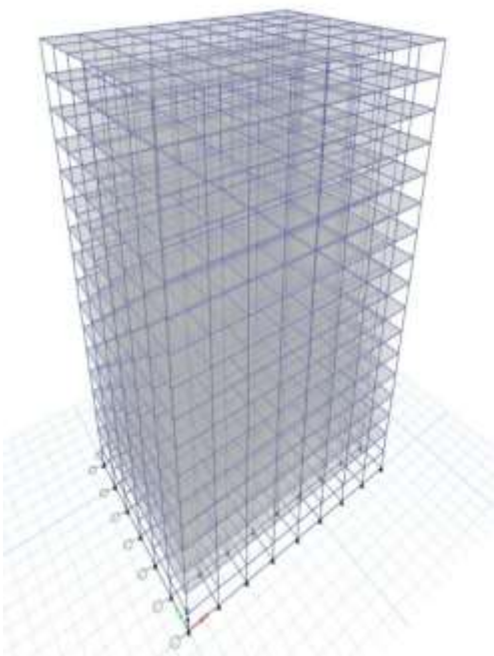


Fig10.3DviewofModelI

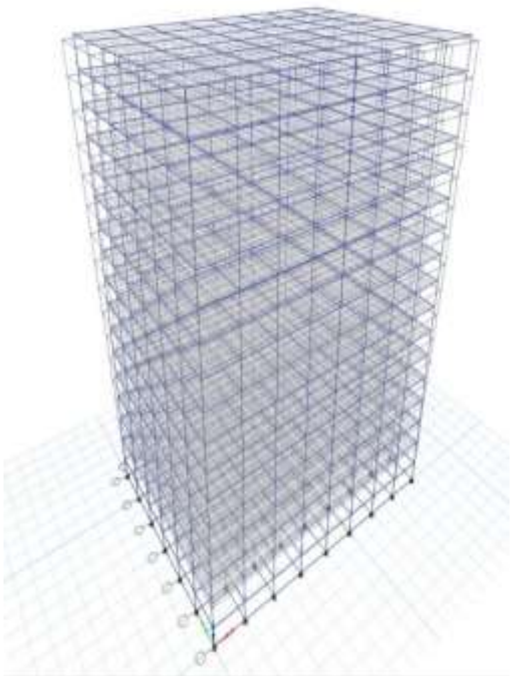


Fig11.DeformationofModelI

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 7, July : 2024

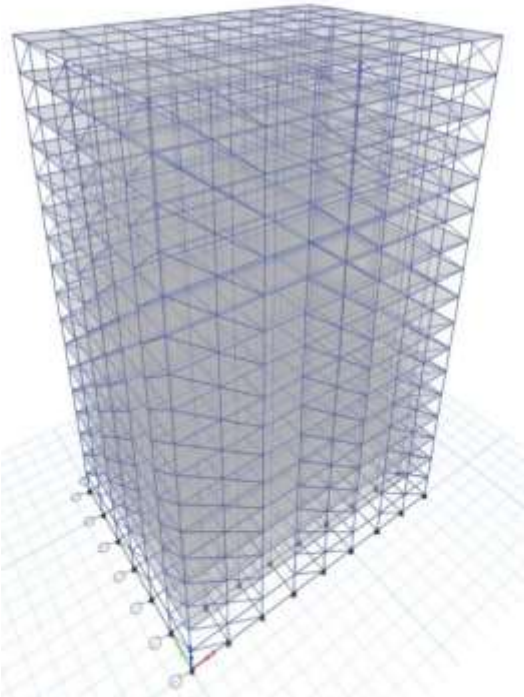


Fig12.3DViewofModelII

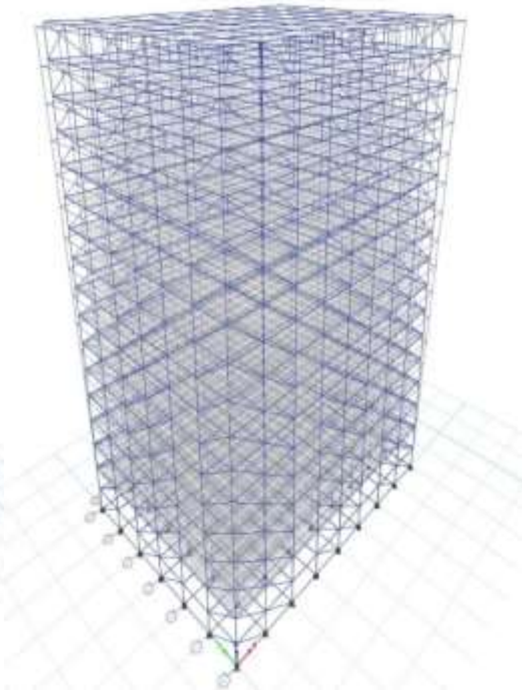


Fig13.Deformation ofModelII

V. RESULTSANDDISSCUSIONS

The chosen building model is reviewed through response spectrum analysis and load combination prescribed by the IS standards. The following are the terms in which the response spectrum results are presented in form of story response plots.

Maximum story Displacement: The tale's lateral displacement with respect to the base is referred to as story displacement. The excessive lateral movement of the building may be controlled by the lateral force- resisting system.

Maximumstory Drift: Storydrift iscalculated bydividingthe distance between two adjacent storiesbythe height of each story.

Maximum story Shear: The total of the lateral pressures exerted at each level of the structure is the maximum story shear. As floor forces are added from the top to the bottom of the building to determine cumulative story shears, they should increase as you descend.

RESULTSFROMRESPONSE SPECTRUM ANALYSIS-RCCONVENTIONALSTRUCTURE

MAXIMUMSTORYDISPLACEMENT–RCCONVENTIONAL STRUCTURE

STORY	ZONEII (mm)	ZONEIII (mm)	ZONEIV (mm)	ZONEV (mm)
Story15	16.091	25.745	38.618	57.926
Story14	15.847	25.355	38.033	57.049
Story13	15.478	24.765	37.147	55.721
Story12	14.988	23.981	35.971	53.957
Story11	14.388	23.021	34.531	51.796
Story10	13.686	21.898	32.847	49.27
Story9	12.89	20.624	30.935	46.403
Story8	12.005	19.209	28.813	43.219
Story7	11.039	17.662	26.494	39.74
Story6	9.995	15.993	23.989	35.984
Story5	8.879	14.206	21.31	31.964
Story4	7.695	12.311	18.467	27.7
Story3	6.446	10.313	15.469	23.204
Story2	5.132	8.212	12.318	18.476
Story1	3.753	6.005	9.007	13.511
GroundFloor	2.311	3.698	5.547	8.321
PlinthLevel	0.832	1.331	1.997	2.995
ColumnBase	0	0	0	0

Table4.MaximumStoryDisplacement of Structure

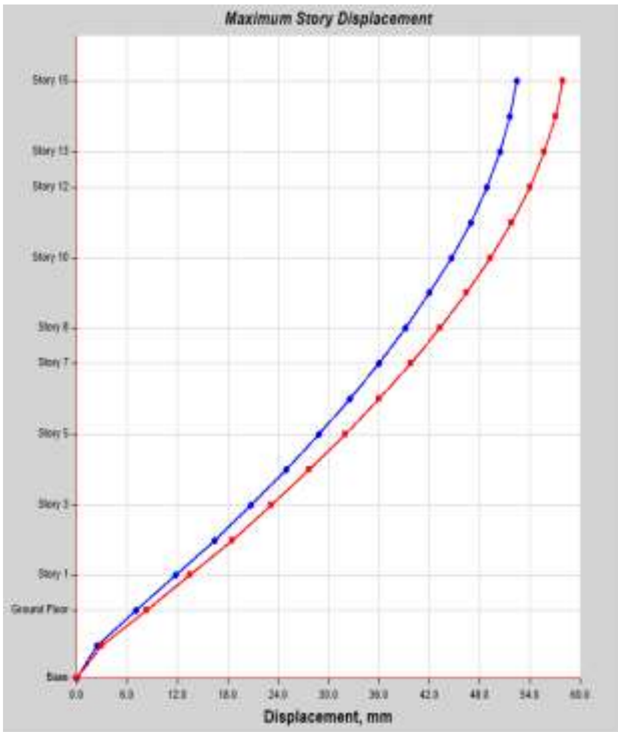


Fig14.MaximumStory Displacement ofModelI

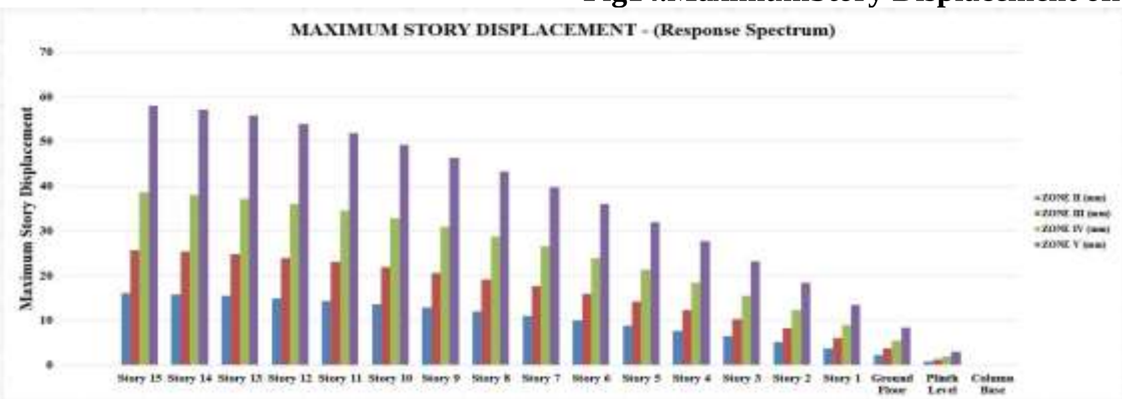


Fig15.ComparisongraphofMaximumStoryDisplacement

MAXIMUMSTORYDRIFT-RCCONVENTIONALSTRUCTURE

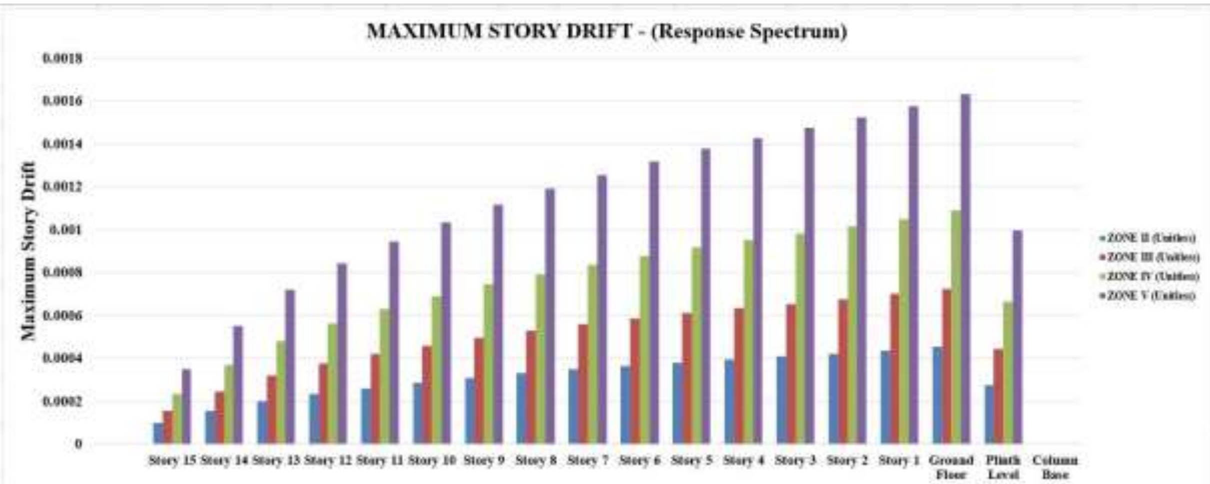


Fig16.Comparisongraph ofMaximumStoryDrift

STORY	ZONEII (Unitless)	ZONEIII (Unitless)	ZONEIV (Unitless)	ZONEV (Unitless)
Story15	0.000098	0.000156	0.000234	0.000351
Story14	0.000154	0.000246	0.000369	0.000553
Story13	0.0002	0.00032	0.00048	0.00072
Story12	0.000235	0.000376	0.000563	0.000845
Story11	0.000262	0.00042	0.00063	0.000945
Story10	0.000287	0.00046	0.00069	0.001035
Story9	0.00031	0.000496	0.000745	0.001117
Story8	0.00033	0.000529	0.000793	0.00119
Story7	0.000349	0.000558	0.000837	0.001255
Story6	0.000366	0.000586	0.000879	0.001318
Story5	0.000382	0.000612	0.000918	0.001377
Story4	0.000397	0.000635	0.000952	0.001428
Story3	0.000409	0.000655	0.000982	0.001474
Story2	0.000423	0.000677	0.001015	0.001523
Story1	0.000438	0.000701	0.001051	0.001577
GroundFloor	0.000454	0.000726	0.001089	0.001634
PlinthLevel	0.000277	0.000444	0.000666	0.000998
ColumnBase	0	0	0	0

Table5.MaximumStoryDriftof Structure

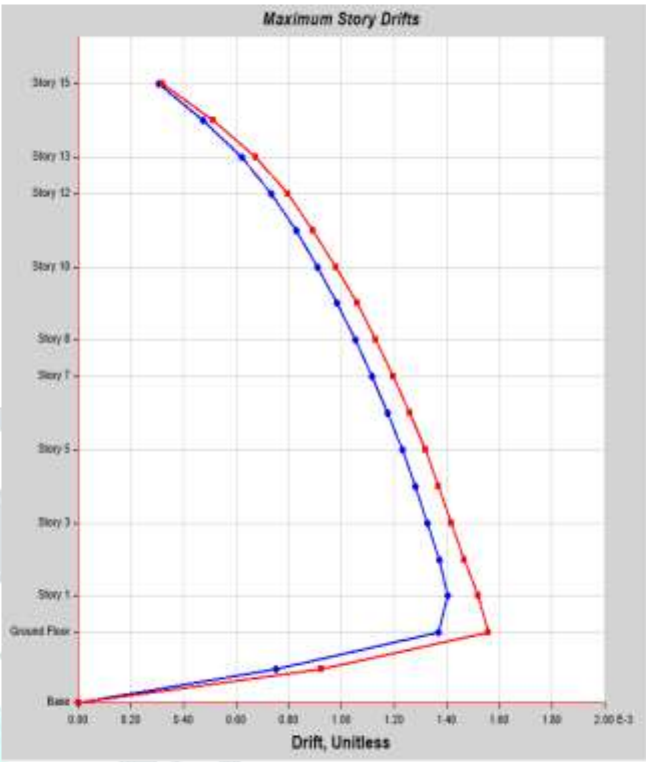


Fig17.MaximumStoryDriftofModelI

5.1.3.MAXIMUMSTORYSHEAR-RCCONVENTIONAL STRUCTURE

STORY	ZONEII (kN)	ZONEIII (kN)	ZONEIV (kN)	ZONEV (kN)
Story15	193.2072	309.1315	463.6972	695.5458
Story14	360.3674	576.5879	864.8818	1297.3227
Story13	484.8545	775.7672	1163.6508	1745.4762
Story12	573.3483	917.3573	1376.0359	2064.0539
Story11	643.3563	1029.3701	1544.0551	2316.0826
Story10	708.2148	1133.1437	1699.7155	2549.5733
Story9	769.9994	1231.999	1847.9985	2771.9977
Story8	826.6426	1322.6281	1983.9421	2975.9132
Story7	879.4551	1407.1281	2110.6922	3166.0383
Story6	930.7513	1489.202	2233.8031	3350.7046
Story5	978.9075	1566.252	2349.378	3524.0669
Story4	1021.362	1634.1793	2451.2689	3676.9034
Story3	1061.5909	1698.5455	2547.8182	3821.7273
Story2	1107.327	1771.7232	2657.5848	3986.3772
Story1	1158.6071	1853.7714	2780.6571	4170.9857
GroundFloor	1201.4284	1922.2855	2883.4283	4325.1424
PlinthLevel	1208.502	1933.6033	2900.4049	4350.6073
ColumnBase	0	0	0	0

Table6.MaximumStoryDisplaceme ntof Structure

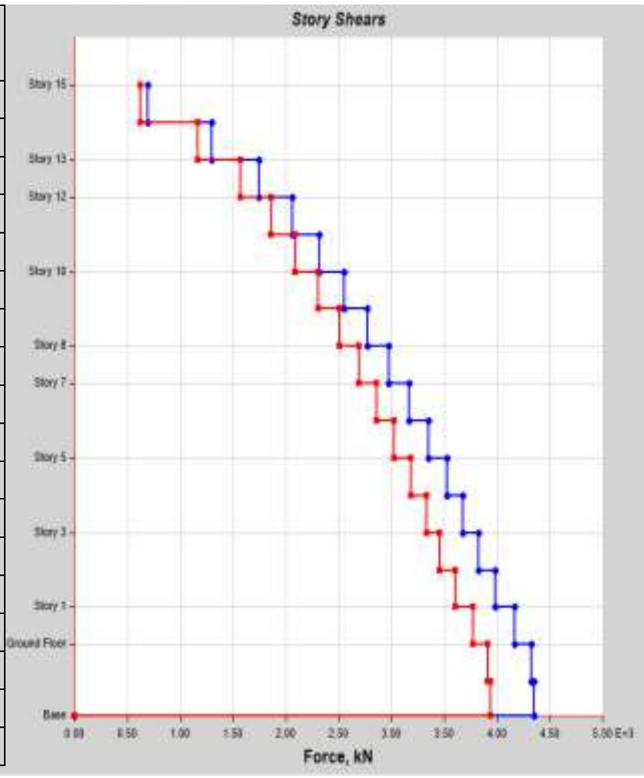


Fig18.MaximumStory DisplacementofModelI

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 7, July : 2024

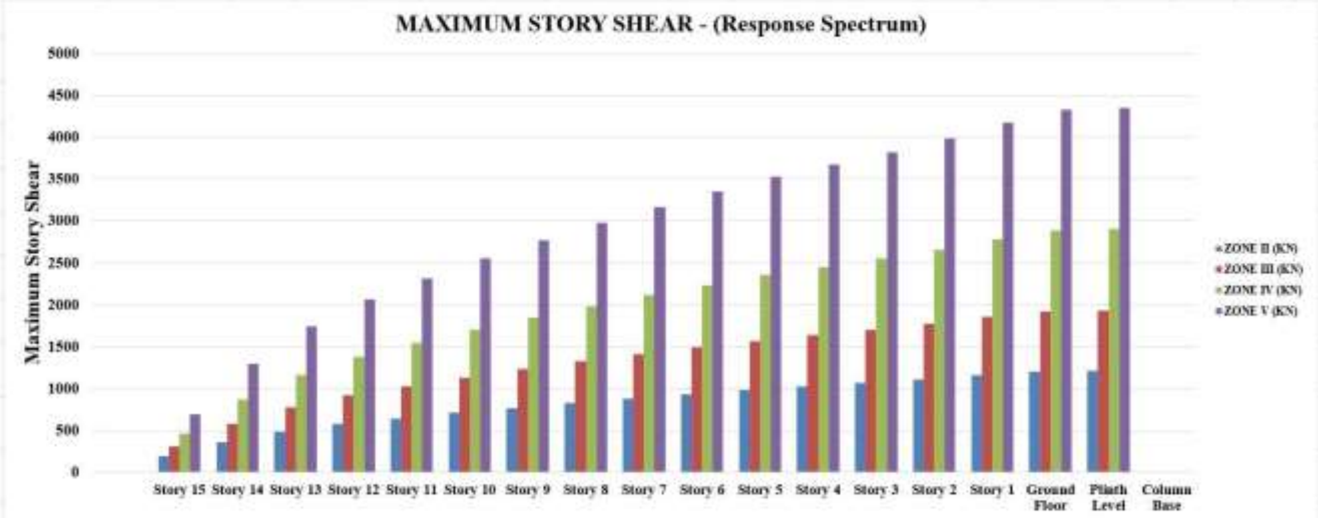


Fig19.ComparisongraphofMaximumStoryDisplacement

RESULTSFROMRESPONSE SPECTRUMANALYSIS–URMINFILL STRUCTURE

MAXIMUMSTORYDISPLACEMENT–URMINFILLSTRUCTURE

STORY	ZONEII (mm)	ZONEIII (mm)	ZONEIV (mm)	ZONEV (mm)
Story15	11.984	19.175	28.762	43.143
Story14	11.459	18.335	27.503	41.254
Story13	10.879	17.407	26.11	39.166
Story12	10.258	16.412	24.618	36.927
Story11	9.597	15.354	23.032	34.548
Story10	8.9	14.24	21.36	32.04
Story9	8.172	13.075	19.612	29.419
Story8	7.416	11.865	17.798	26.697
Story7	6.636	10.617	15.926	23.889
Story6	5.837	9.339	14.008	21.012
Story5	5.024	8.039	12.058	18.087
Story4	4.206	6.729	10.093	15.14
Story3	3.39	5.424	8.136	12.204
Story2	2.59	4.144	6.215	9.323
Story1	1.823	2.917	4.375	6.563
GroundFloor	1.11	1.777	2.665	3.997
PlinthLevel	0.576	0.921	1.382	2.073
ColumnBase	0	0	0	0

Table7.MaximumStoryDisplacementof Structure

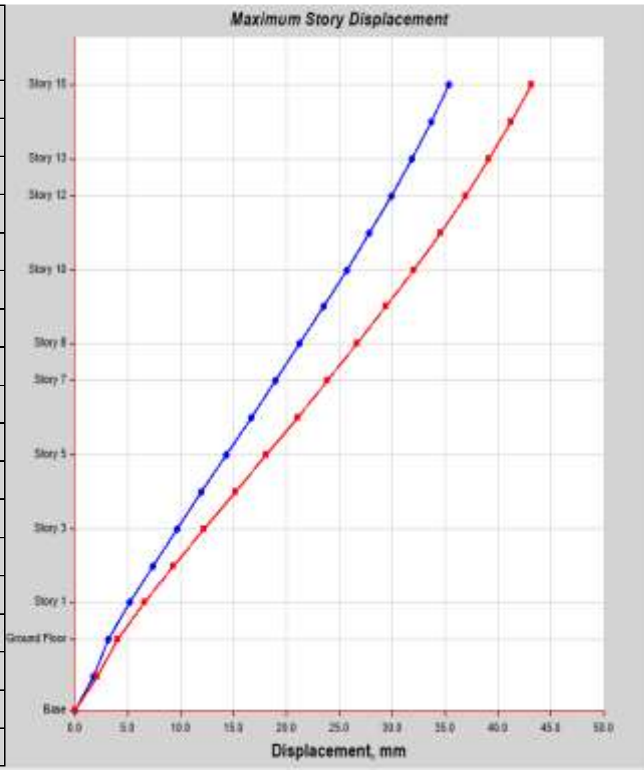


Fig20.MaximumStory DisplacementofModelI

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 7, July : 2024

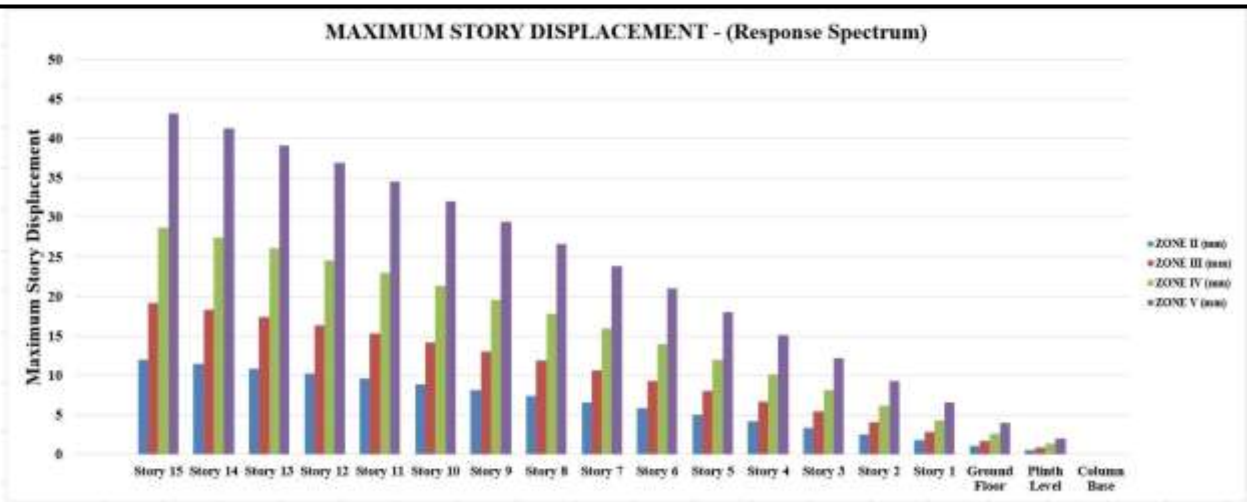


Fig21.ComparisongraphofMaximumStoryDisplacement

MAXIMUMSTORYDRIFT-URMINFILL STRUCTURE

STORY	ZONEII (Unitless)	ZONEIII (Unitless)	ZONEIV (Unitless)	ZONEV (Unitless)
Story15	0.000175	0.000279	0.000419	0.000629
Story14	0.000198	0.000316	0.000475	0.000712
Story13	0.000215	0.000344	0.000516	0.000774
Story12	0.00023	0.000367	0.000551	0.000826
Story11	0.000241	0.000385	0.000578	0.000866
Story10	0.000249	0.000398	0.000597	0.000896
Story9	0.000255	0.000408	0.000611	0.000917
Story8	0.000259	0.000414	0.000621	0.000931
Story7	0.000261	0.000417	0.000626	0.000939
Story6	0.000261	0.000418	0.000627	0.00094
Story5	0.000259	0.000415	0.000622	0.000934
Story4	0.000255	0.000408	0.000612	0.000918
Story3	0.000247	0.000396	0.000593	0.00089
Story2	0.000235	0.000376	0.000564	0.000845
Story1	0.000217	0.000347	0.000521	0.000781
GroundFloor	0.000241	0.000386	0.000578	0.000868
PlinthLevel	0.000192	0.000307	0.000461	0.000691
ColumnBase	0	0	0	0

Table8.MaximumStoryDriftof Structure

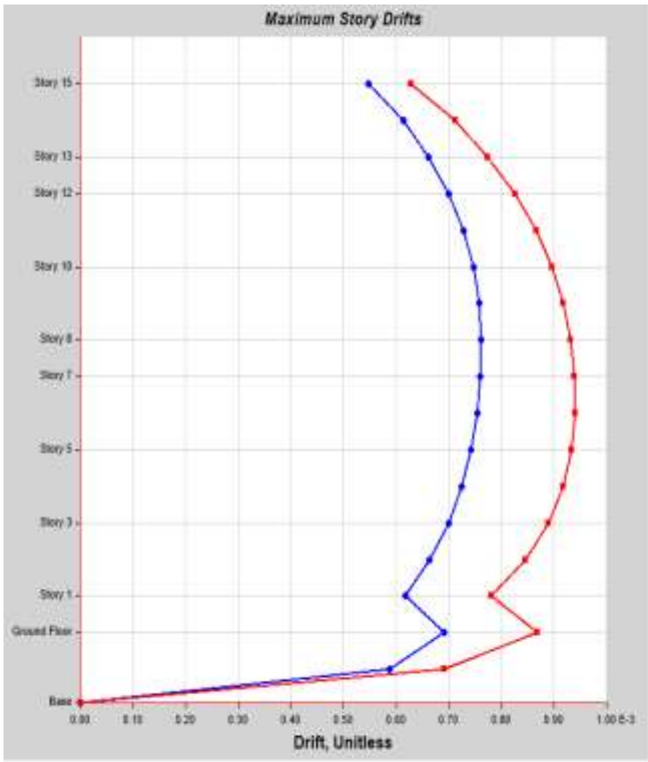


Fig22.MaximumStoryDriftofModelI

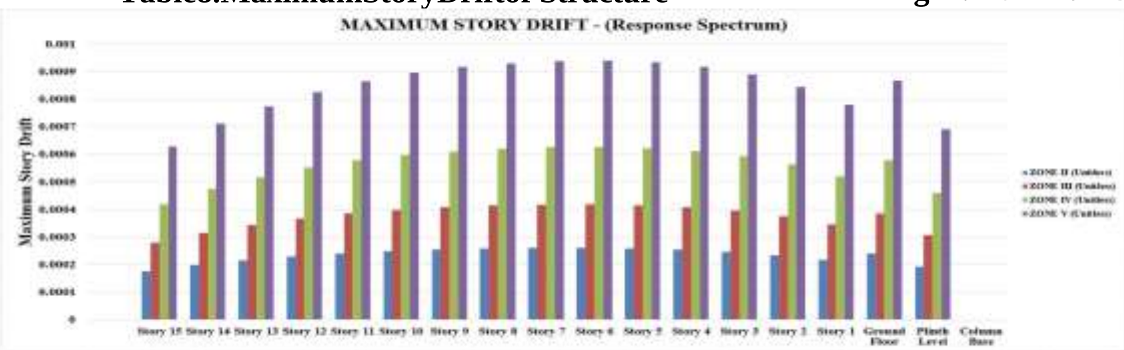


Fig23.Comparisongraph ofMaximumStoryDrift

MAXIMUMSTORYSHEAR-URMINFILL STRUCTURE

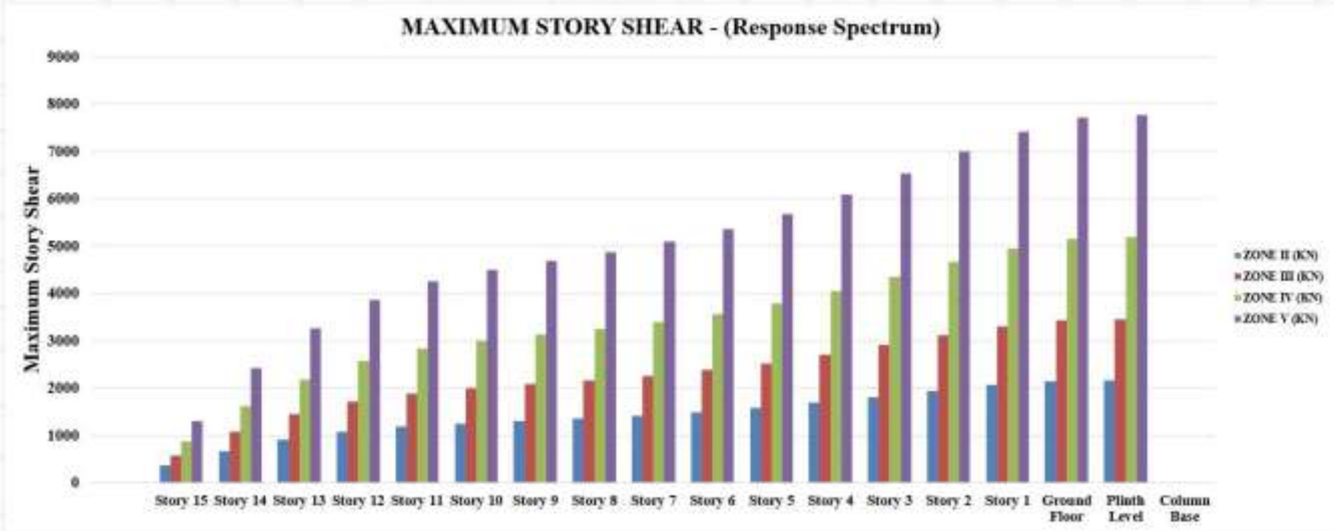


Fig24.ComparisongraphofMaximumStoryDisplacement

STORY	ZONEII (kN)	ZONEIII (kN)	ZONEIV (kN)	ZONEV (kN)
Story15	361.7152	578.7443	868.1164	1302.1746
Story14	672.7839	1076.4542	1614.6813	2422.0219
Story13	909.0784	1454.5254	2181.7881	3272.6821
Story12	1074.2131	1718.741	2578.1114	3867.1672
Story11	1181.5884	1890.5414	2835.8121	4253.7182
Story10	1251.0929	2001.7487	3002.6231	4503.9346
Story9	1303.4234	2085.4775	3128.2163	4692.3244
Story8	1354.6918	2167.5069	3251.2603	4876.8905
Story7	1414.5313	2263.2501	3394.8752	5092.3128
Story6	1488.2359	2381.1774	3571.7662	5357.6492
Story5	1579.4738	2527.1581	3790.7372	5686.1057
Story4	1689.8289	2703.7262	4055.5893	6083.384
Story3	1815.4811	2904.7697	4357.1545	6535.7318
Story2	1944.9534	3111.9254	4667.8881	7001.8321
Story1	2061.032	3297.6512	4946.4768	7419.7152
GroundFloor	2145.5824	3432.9318	5149.3977	7724.0965
PlinthLevel	2160.2249	3456.3598	5184.5398	7776.8096
ColumnBase	0	0	0	0

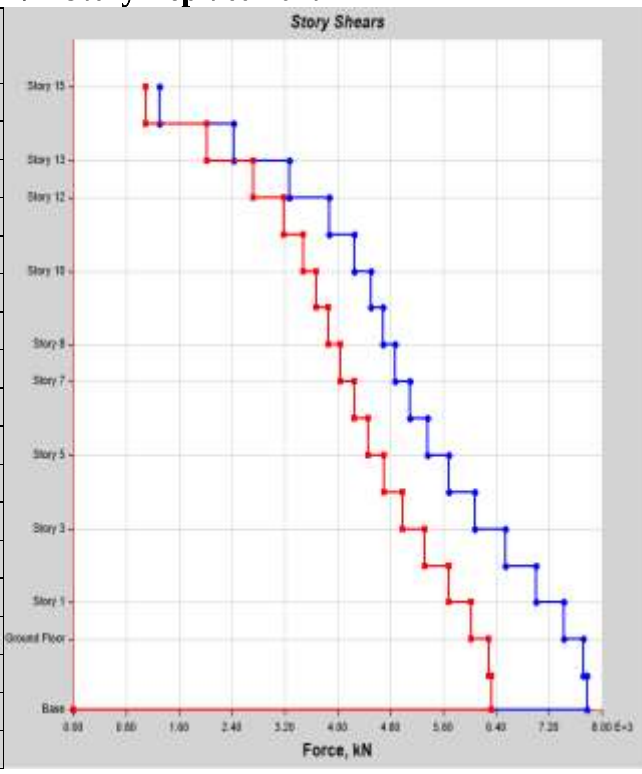


Table9.MaximumStoryDisplacement of Structure

Fig25.MaximumStory DisplacementofModelI

From the above results it can be noted that URM Infill wall structures have the greater impact in the seismic resistance when compared to RC conventional structure.

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 7, July : 2024

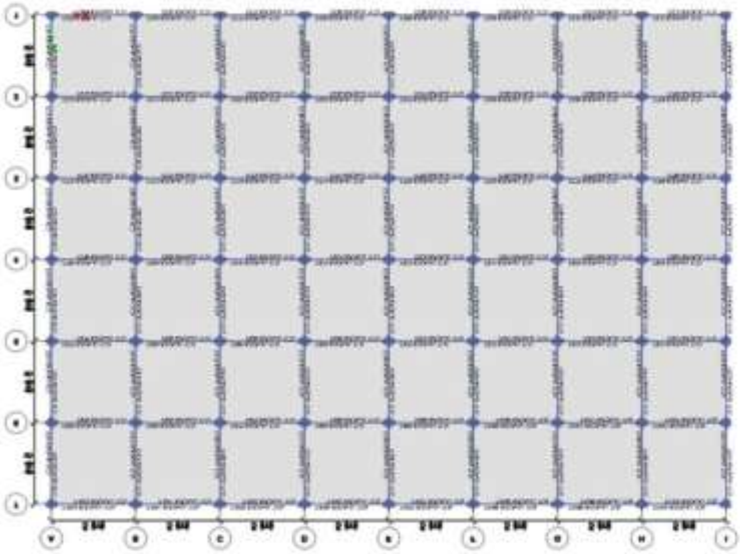


Fig26. HingeProperties

Nowperforming the Non-linear static Pushover analysis in the displacement control manner we got the results in terms of target displacement and performance point and base shear.
These define as follows:

a) **Target displacement:** Target displacement is the maximum drift that a structure may experience under seismic stresses without completely collapsing.

b) **Performance point:** For a certain damping ratio, the Performance Point—which denotes the condition of the structure's maximum inelastic capacity—can be discovered by finding the intersection of the Capacity Spectrum and Demand Spectrum.

c) **Base shear:** Base shear is a measure of the greatest predicted lateral force that seismic activity will exert at the base of the structure.

RESULTSFROMPUSHOVERANALYSIS-ZONE-V

MODELI:(CONVENTIONALRCSTRUCTURE)

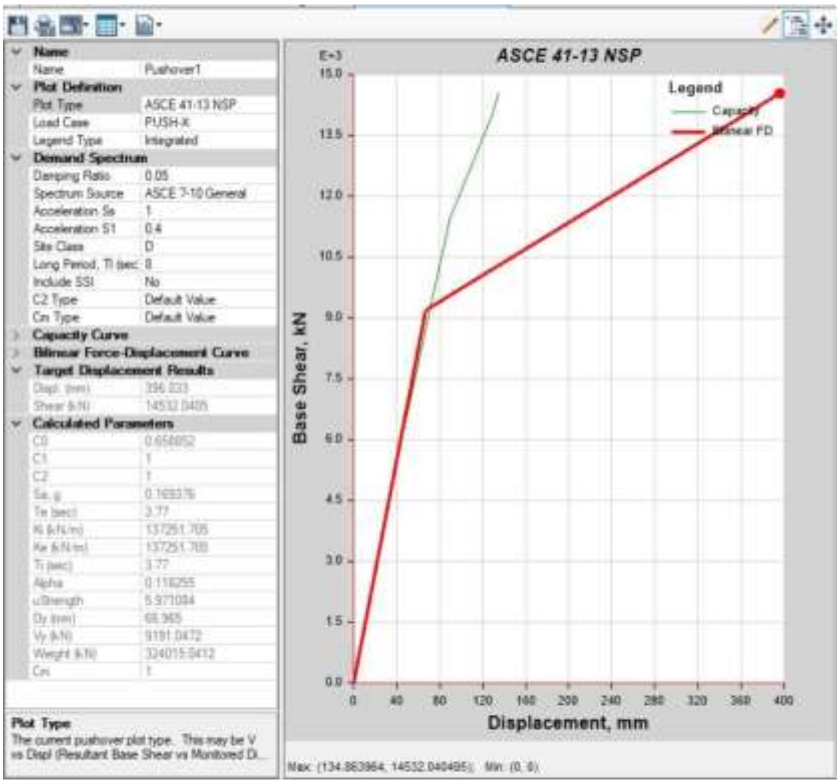


Fig27.TargetDisplacementPointResultsfromASCE41-13NSP

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 7, July : 2024

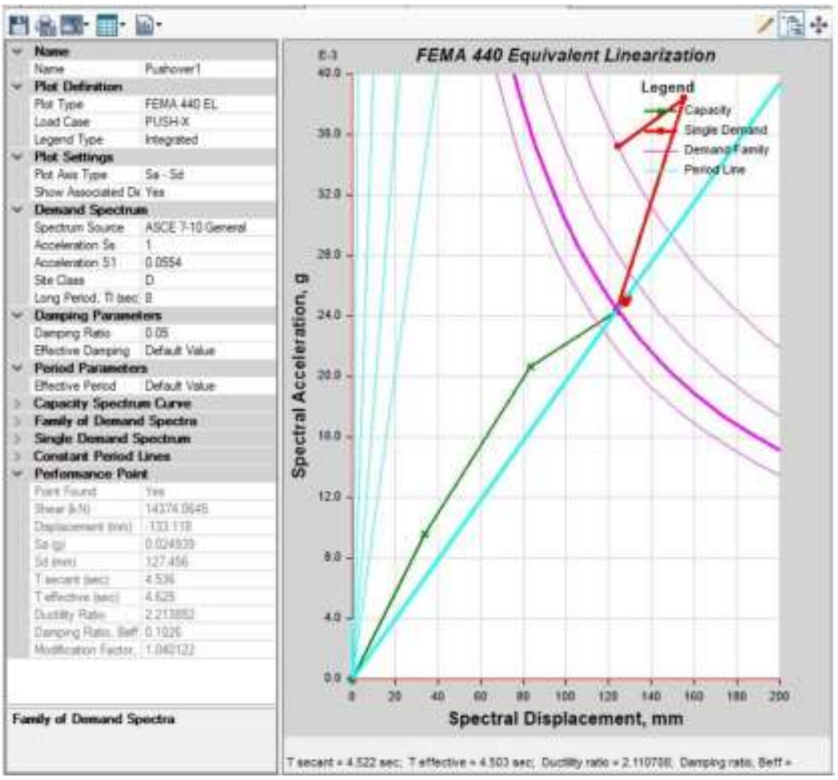


Fig28.Performance PointResultsfromFEMA440EL

	Displacement(mm)	Shear(KN)
Target displacement Point	396.003	14532.0405
Performance Point	133.118	14374.0645

Table10.Target displacement and Performance point

5.2.2.MODEL II:(URMINFILLWALLSTRUCTURE)

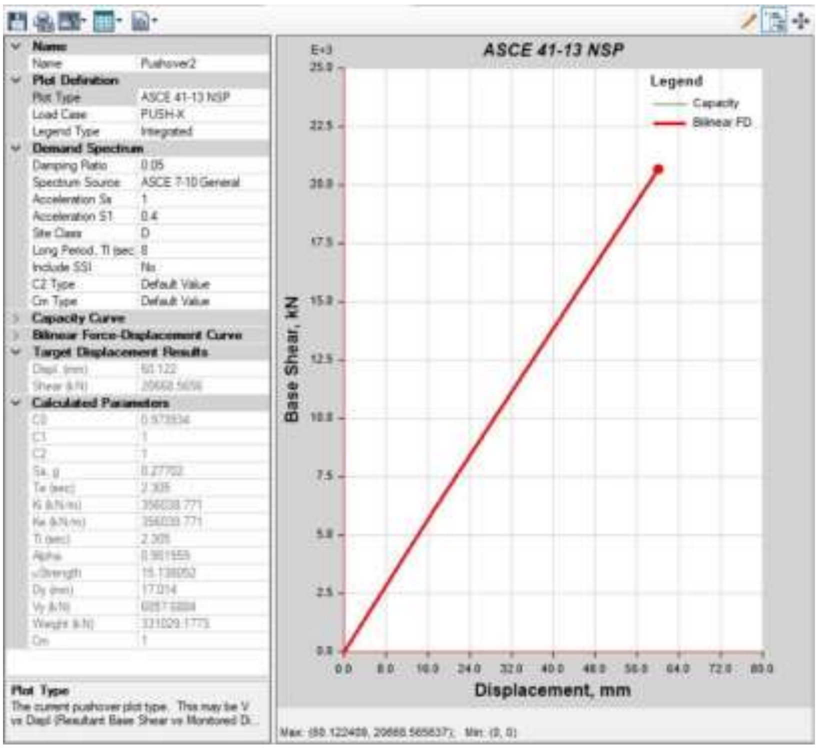


Fig29.TargetDisplacementPointResultsfromASCE41-13NSP

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 7, July : 2024

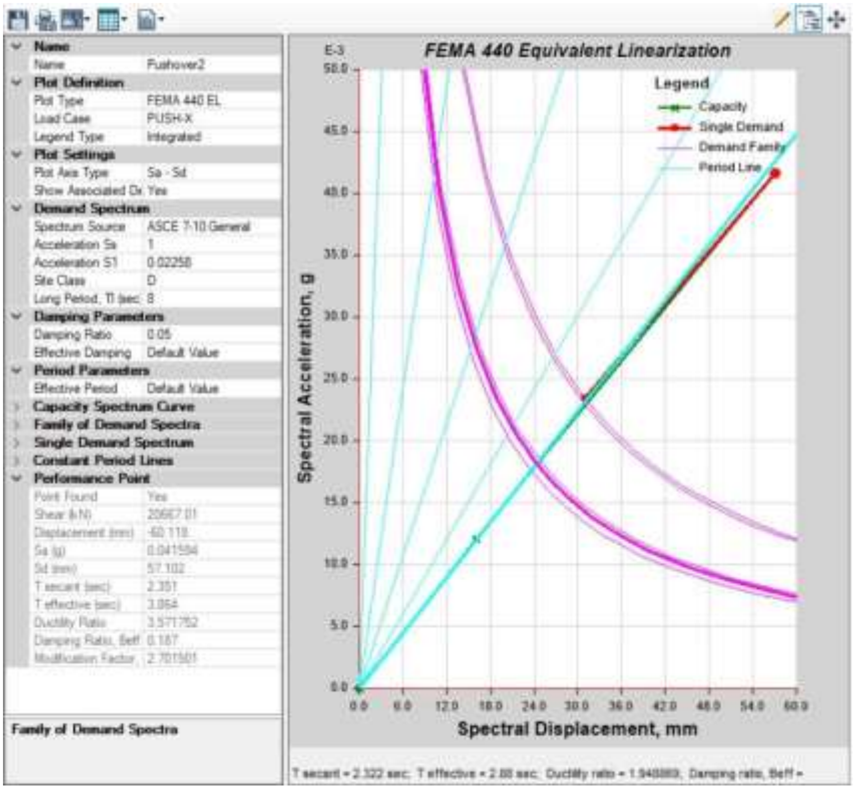


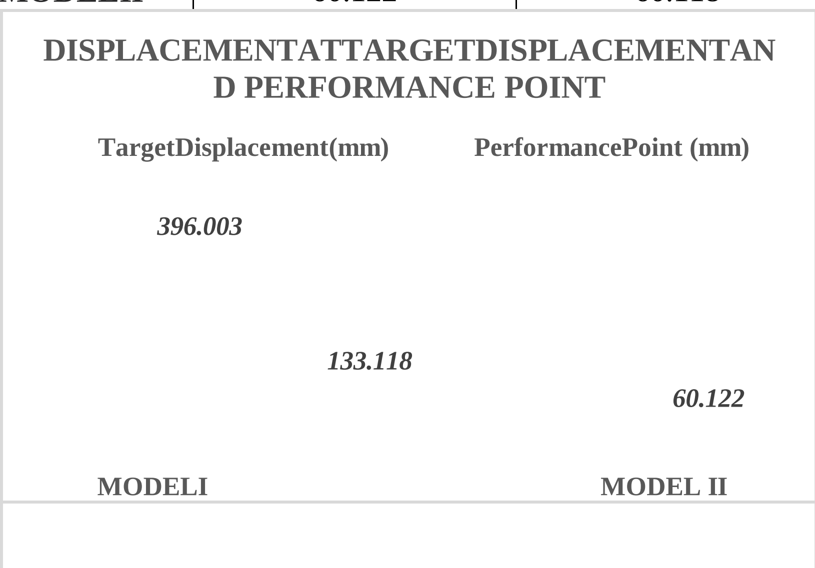
Fig30.Performance PointResultsfromFEMA440EL

	Displacement(mm)	Shear(KN)
TargetdisplacementPoint	60.122	20668.5656
PerformancePoint	60.118	20667.01

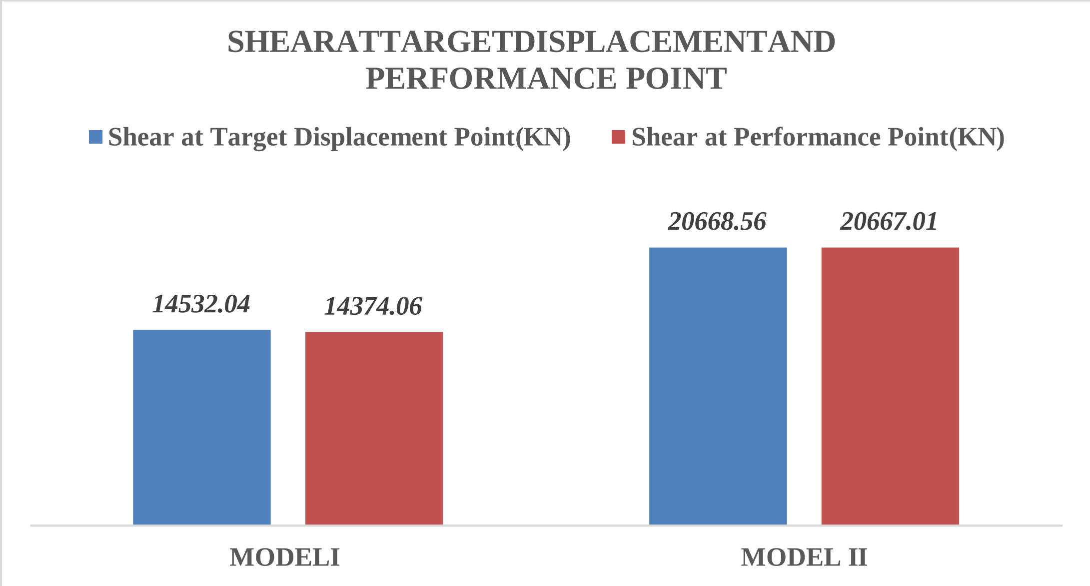
Table11.TargetdisplacementandPerformancepoint

COMPARISIONFROMPUSHOVERANALYSIS

MODEL	TargetDisplacement(mm)	PerformancePoint(mm)
MODELI	396.003	133.118
MODELII	60.122	60.118



MODEL	ShearatTarget DisplacementPoint(KN)	ShearatPerformance Point(KN)
MODELI	14532.0405	14374.0645
MODELII	20668.5656	20667.01



Due to the seismic effects in the Zone V the maximum shear occurs at base of the structure, maximumstorydisplacementoccurredatthetopstorywhichisstory 15andthemaximumdisplacement of the structure is found out.

Both models' push over curves practically coincides in the Y direction. Pushover Curves from this study's findings demonstrate that the building's reaction towards the URM Infill wall structure and the RC Conventional structure differs significantly. The performance point and target displacement results also follow the same phenomenon as the maximum story displacement. Model II has the lower displacement results than the Model I.From the above figures Model II have the compatibly more lateraldisplacement and performance points when performing nonlinearstatic pushover analysis.

VI. CONCLUSIONS

1. The building is more resistant to seismic acceleration thanks to the URM Infill wall construction. Whena structure is modelled, the results of the modal analysis reveal certain peculiar modes. However, it is discovered that such forms get very little mass engagement. As a result, these modes won't materially alter the building's reaction.
2. It is effective to use the infill wall structure rather than the conventional structure because the performance point is very near and achieved at 60.122 mm for Zone V as well as the results from response spectrum analysis of the URM Infill are significantly better than the conventional structure. 2. Pushover Curves obtained from this study show that there is a considerable variance between the response of the URM Infill wall structure as well as RC Conventional structure.
3. When compared to a conventional structure in Zone V, the use of URM walls in the RC construction significantly reduced the maximum story displacement, story drift, and base shear. As a result, the conventional structure attracted fewer seismic forces.
4. The use of URM Infills modifies the structures seismic behaviour. The models thatused the URM Infill system responded well to all of the parameters, acting as a bracing framework.

5. Whencomparedto ModelI,Model II's base shear, tale displacement andstorydriftshave all decreased.

This studythus concludes thatthebuildingis onlysecure whenit has URM Infill walls andsuggests that more research is required with various problems.

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