Analytical Study Of Braced Unsymmetrical Rcc Buildings

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Abstract - **The present analytical seismic research deals with the optimal alignment of steel bracing to the RC system by means of response spectrum analysis with unsymmetrical building plan of G+30 floors in zone 5 following IS 1893(part-1):2002 and IS 13920:1993. Various steel bracing systems such as X, Single Diagonal, Inverted V braces are available at different structural locations. Within the story, braces are connected and five different types are considered in more than one story. Compared to the bare frame, the tests were compared to five styles and the optimal bracing position. Compared to lateral displacement, story drift, story stiffness, base shear, story torsion, eccentricity, and time period, the structure's response. Earthquake Engineering's sector has been around for many years. Earthquake engineers made significant contributions to the seismic protection of the country's many major structures. Braced frames were an important and useful tool for strengthening structures against lateral loads in comparison to other structural systems, such as moment-resistant frames or shear walls. In seismic excitations, inclined elements react as web truss elements that would bear stresses of compression or tension. This axial reaction results in fewer moments and thus smaller sizes in beam and column parts compared to members in equivalent resistant frame moments. Two separate Unsymmetrical RCC framed buildings are therefore studied in this study, one braced and another un braced subjected to lateral loads. Seismic analysis is conducted using Etabs technology to test the building according to IS 1893:2002 for various load combinations. Based on floor displacements, storage drifts, base shear, axial force and bending moments, the comparison is made between the braced and un braced building. It has been observed that the braced building's seismic performance is improved compared to the unbraced building.**

keywords - **Seismic analysis, Earthquake, Seismic research, unsymmetrical buildings, unsymmetrical frames, bracing systems.**

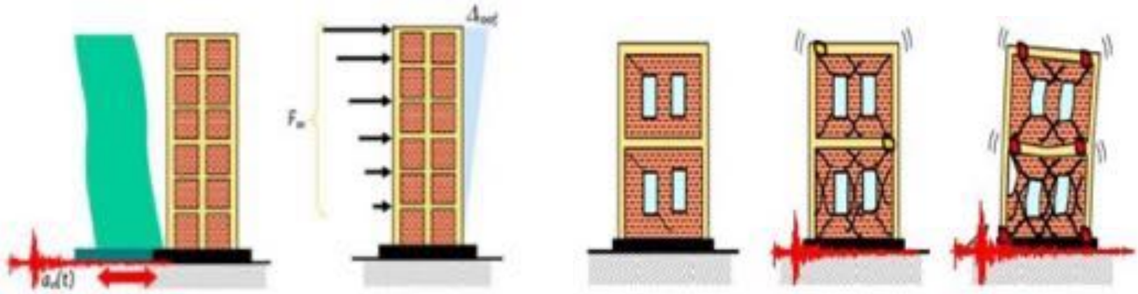
I. INTRODUCTION

1.1 General: Auxiliary investigation is the foundation of structural building. During late years, there has been a developing accentuation on utilizing PC supported programming and apparatuses to break down the structures. There has likewise been progression in limited component examination of structures utilizing Finite Element Analysis techniques or framework investigation. These improvements are most welcome, as they mitigate the specialist of the frequently protracted figuring and systems required to be pursued while enormous or muddled structures are examined utilizing old style strategies. Be that as it may, not all the time such nitty gritty investigation are important to be performed for example now and then, simply surmised investigation could get the job done our necessities as if there should arise an occurrence of setting up the harsh gauges and taking an interest in the offering procedure for a delicate. Presently days, elevated structures and multi-inlet multi-story structures are extremely basic in metropolitan urban communities. The investigation of edges of multi-storeyed structures demonstrates to be somewhat bulky as the casings have countless joints which are allowed to move.

Seismic analysis: Seismic analysis is a subset of structural analysis, calculating the response to earthquakes from construction. It be part of the structural design, earthquake engineering and structural evaluation and retrofitting process (see structural engineering) in regions where earthquakes are prevalent. As found in figure, a structure can possibly 'wave' to and fro during a seismic tremor (or even an extreme breeze). This be known as the 'basic mode', and is the most minimal recurrence building reaction. mainly structures, be that as it may, have higher methods of reaction, which are particularly initiated during seismic tremors. The figure just shows the subsequent mode, yet there are higher 'shimmy' (strange vibration) modes. By the by, the first and second modes will in general reason the most harm as a rule.

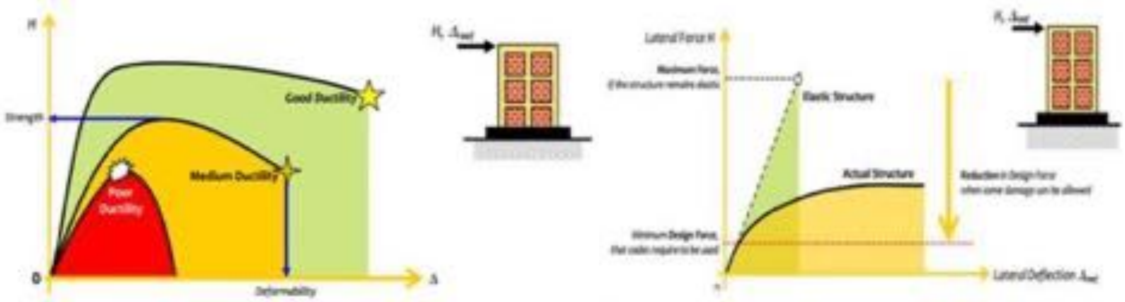
1.2 Dynamic actions on buildings-wind and earthquake: Dynamic activities are caused on structures by both wind and seismic tremor. Yet, plan for wind powers and for seismic tremor impacts are unmistakably unique. The activity theory of basic plan use power as the premise, which is predictable in wind structure, wherein the structure is exposed to a weight on its uncovered surface region; this is power type stacking. In any case, in seismic tremor structure, the structure is exposed to irregular movement of the ground at its base (Figure 1.1), which initiates idleness powers in the structure that thusly cause focuses on; this is removal type stacking. Another method for communicating this distinction is through the heap twisting bend of the structure – the interest on the structure is power (i.e., vertical pivot) in power type stacking forced by wind weight, and removal (i.e., even hub) in relocation type stacking forced by tremor shaking.

Wind power on the structure has a non-zero mean part superposed with a generally little wavering part. Hence, under wind powers, the structure may understanding little variances in the pressure field, however inversion of stresses happens just when the heading of wind turns around, which happens just over a huge span of time. Then again, the movement of the ground during the seismic tremor is cyclic about the impartial situation of the structure. Hence, the worries in the structure because of seismic activities experience many complete inversions and that assumed control over the little span of tremor.



1.3 Basic Aspects of Seismic Design: In addition to building rigidity, the weight of the building being built determines seismic architecture, as earthquake causes inertia forces proportional to the building size. Structuring structures to carry on flexibly during tremors without harm may render the venture monetarily unviable. As an outcome, it might be vital for the structure to experience harm and along these lines scatter the vitality contribution to it during the tremor. Along these lines, the conventional quake safe plan theory necessitates that ordinary structures ought to have the option to stand up to:
a) Minor (and incessant) shaking with no harm to basic and non-basic components;
b) Moderate shaking with minor harm to auxiliary components, and some harm to non-basic components;
c) Severe (and rare) shaking with harm to auxiliary components, however with NO breakdown.
Along these lines, structures are planned uniquely for a portion (~ 8 – 14%) of the power that they would understanding, on the off chance that they were intended to stay versatile during the normal solid ground shaking and in this manner allowing harm. In any case, adequate introductory solidness is required to be guaranteed to keep away from basic harm under minor shaking. In this manner, seismic structure adjusts decreased cost and adequate harm, to make the undertaking practical. This cautious parity is shown up in light of broad research and definite post-tremor harm appraisal thinks about. An abundance of this data is converted into exact seismic configuration arrangements. Interestingly, auxiliary harm isn't adequate under plan wind powers. Consequently, structure against tremor impacts is called as seismic tremor safe plan and not quake evidence plan.

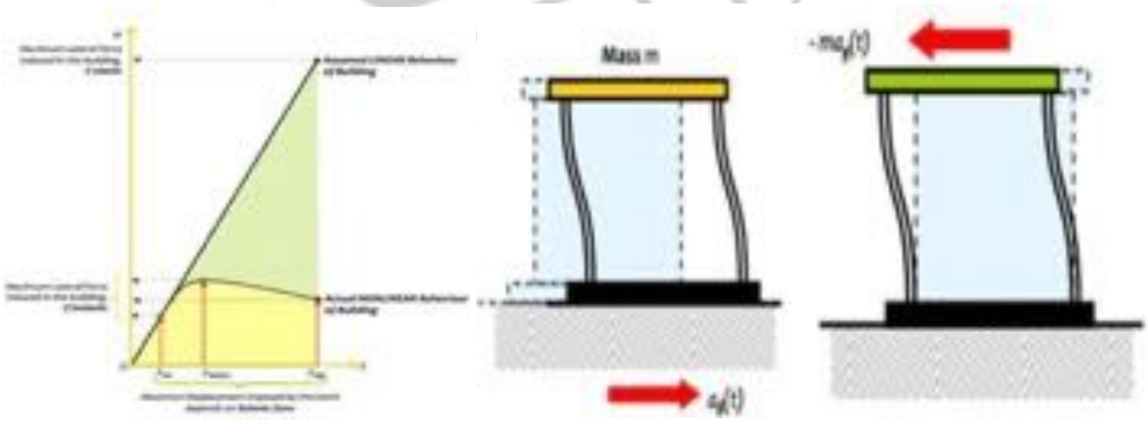
1.4 The four virtues of earthquake resistant buildings: In order for a building to perform satisfactorily during earthquakes, the earthquake-resistant design philosophy must be met.
Characteristics of buildings: There are four parts of structures that draftsmen and configuration architects work with to make the quake safe plan of a structure, in particular seismic auxiliary design, sidelong solidness, parallel quality and pliability, notwithstanding different angles like structure, style, usefulness and solace of building. Horizontal firmness, sidelong quality and pliability of structures can be guaranteed by carefully following most seismic plan codes. In any case, great seismic auxiliary setup can be guaranteed by following rational engineering highlights that outcomes in great basic conduct.
Seismic Structural configuration: Seismic auxiliary setup involves three fundamental perspectives, in particular geometry, shape and size of the structure, area and size of auxiliary components, and area and size of critical non-auxiliary components. Impact of the geometry of a structure on its quake execution is best comprehended from the fundamental geometries of raised and curved focal points from school-day material science class. inside territory of raised focal point totally inside the focal point. In any case, the equivalent isn't valid for the sunken focal point; a piece of the zone of the curved focal point. raised geometries are wanted to those with inward geometries, as the previous exhibit predominant quake execution. With regards to structures, curved formed structures have direct burden ways for moving quake shaking initiated idleness powers to their bases for any heading of ground shaking, while inward structures require twisting of burden ways for shaking of the ground along specific bearings that outcome in stress focuses at all focuses where the heap ways twist. In view of the above discourse, regularly assembled structures can be set in two classes, specifically basic and complex. Structures by rise stand the test possibility of doing great during a tremor, since idleness powers are moved without bowing because of the geometry of the structure. However, structures with difficulties and focal imperative to the progression of idleness powers; latency power ways need to twist before arriving at the ground.



1.5 Earthquake Demand vs Earthquake Capacity: Not at all like the all other stacking impacts, (barring tidal wave loads), impact many, forced burdens and dead loads, quake serious, in light of the fact that it forces removal under the structure, which is time differing. This, thusly, requests horizontal disfigurement in the structure rises. bigger be seriousness of this forced relative distortion. Thusly, primary test be fulfil twofold need –structure ought to have the option to withstand this forced twisting with harm under little power breakdown force structure needs to have enormous inelastic twisting limit and wants to have the quality in the entirety of individuals to support the powers and minutes instigated. Allure technique for plan of structures ought to in this manner consider the disfigurement request on the structure and the miss happening request on the structure and the distortion limit of the structure. The previous relies upon the seismo-structural area of the structure, yet be inside plan experts (i.e., planners and specialists). The worry is that both of these amounts have vulnerabilities. On one hand, despite the fact that some understanding is accessible on the greatest conceivable ground dislodging at an area, earth researchers are not ready to plainly give the harming seismic tremor consistently given shocks. Also, then again, systematic apparatuses are not accessible to gauge accurately the general nonlinear conduct of an as-constructed definitive distortion limit. Above fraction about the plan, system ought to utilized be bring about advanced certainty on the auxiliary wellbeing of the structure for intended breakdown during expected serious seismic tremor imperative post-quake execution (any rate a base wanted extreme disfigurement limit). There are numerous methods that are embraced/recommended around the world (e.g., Goel 2008). One basic structure system incorporates adherence to the accompanying grouping:

a) Arrive at a straightforward by and large geometry of the structure for the required stature. Building ought to be proportional with regards to the realized precepts of adequate maximum cutoff points of in general slimness proportion and plan perspective proportion, and every one of the dialogs accessible in quake plan writing on satisfactory seismic auxiliary designs;
b) Adopt a basic framework oppose horizontal burdens burden ways arrangement bearings structure. Allure desirable over utilize basic dividers in RC building expected to oppose solid quake shaking.
c) Determine the primer measuring of individual auxiliary components, in light of adequate slimness proportions and cross-sectional viewpoint proportions, and least fortification necessities.
d) Perform seismic plan of every auxiliary component of the structure.

1.6 Forced-Based Design to Displacement-Based Design: A change of edge of reference of miss happening encourages changing over the moving base issue of quake shaking of structures into a fixed base issue. The last is simple to deal with, since configuration practice is familiar with investigation and plan of structures exposed to powers, and not exposed to relocations or increasing velocities. Accordingly, presently the increasing speed reaction range permits snappy, back-of-the-envelope type counts by senior designers to check the ball park estimations of power created in a structure during quake shaking. In beginning of structuring structures to oppose seismic tremors, a quake actuated horizontal power was believed to be the main driver of the tremor issue. Creators saw that structures performed well, in the event that they were intended for parallel powers; for the most part, this horizontal power was because of wind impacts. Consequently, as a first proportion of intentionally planning for seismic tremor impacts, fashioners took 10% of the heaviness of the structure and applied it as a parallel power on the structure (conveyed along the stature). Yet, the 10% power was too punishing for taller structures. Around that time, understanding developed on the ground movements, and it was found out that various structures react diversely to a similar ground shaking. In this manner, the structure parallel power was currently taken as an element of the major characteristic time of the structure. This was not adequate either. Numerous structures demonstrated weak execution, i.e., crumbled all of a sudden in low seismic areas. This was the start of understanding the significance of presenting malleability in structures. In any case, the strategy for presenting pliability was prescriptive; it depended on restricted research facility tests performed on basic components and sub-collections. In the accompanying parts, seismic tremor DEMAND on the structure and quake CAPACITY of the structure are talked about. At the same time, the related fundamental ideas are explained and exhibited with fitting numerical work.



1.7 SAP 2000: SAP2000 speaks to the most modern and easy to use arrival of the SAP arrangement of PC programs. When at first discharged in 1996, SAP2000 was the primary adaptation of SAP to be totally coordinated inside Microsoft Windows. It includes an incredible graphical UI that is unparalleled as far as convenience and profitability.

a) Program Levels and Features: The most recent arrival of SAP2000 is accessible in three diverse investigative levels that all offer the equivalent graphical UI: SAP2000 Basic, SAP2000 PLUS and SAP2000 Advanced. These projects highlight modern capacities, for example, quick condition solvers, power and removal stacking, non-kaleidoscopic casing components, pressure just supports, post-tensioning ligaments, profoundly exact shell components, Eigen and Ritz modular examination, numerous facilitate frameworks for slanted geometry, a wide range of imperative choices, the capacity to blend freely characterized lattices,

a completely coupled 6-by-6 spring solidness, and the alternative to consolidate or envelope different unique investigations in a similar run.
Examination abilities incorporate static nonlinear investigation for material and geometric impacts, including sucker examination; nonlinear time-history examination by modular superposition or direct reconciliation; clasping examination; and recurrence area examination (both unfaltering state and power-unearthly thickness types.) All of the above projects highlight incredible and totally coordinated structure for steel, solid, aluminium, and cold-framed steel, all accessible from inside a similar interface used to make and break down the model. The structure of steel and aluminium outline individuals highlights introductory part estimating and iterative streamlining.
b) All ETABS information, including model data, examination results, and configuration results, can be gotten to utilizing a forbidden information structure. Forbidden information can be altered and showed in the interface, or sent out to a Microsoft Access database record, a Microsoft Excel spreadsheet document, or a straightforward book record. You can utilize sent out information to make reports or to perform particular figuring's. This equivalent unthinkable information can be brought into ETABS, empowering you to produce or change models outside ETABS. Import and fare capacities likewise exist for other prominent drafting and configuration programs.

1.8 Objective of the Study:

a) For research braced and unbraced building seismic quality using IS 1893(Part1)-2002.
b) To improve the x-type bracing system structure.
c) Study under static and dynamic charging of the structure.
d) Comparing the structure response with and without braced structure under dynamic loading.

1.9 Scope of the study:

a) The latest bracing device research is confined to multi-story high-rise buildings.
b) Use of complete steel superstructure and concrete foundations to establish structural behaviour in order to function on bracing systems.

II. LITERATURE REVIEW

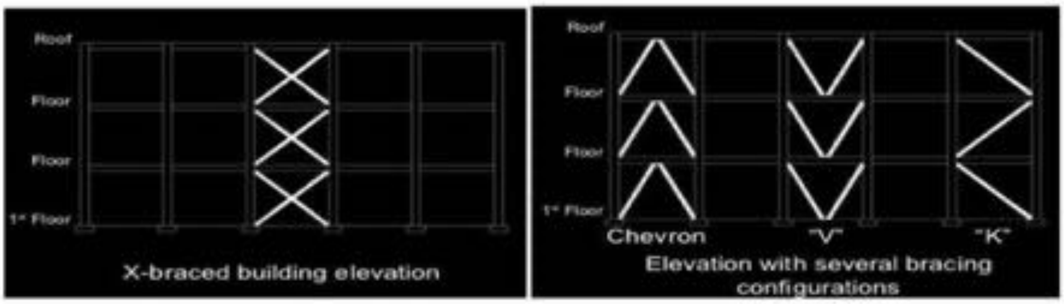
" Z.A. Siddhiqui[1] and Rasheed Hameed[2] et and all., (2014): The concentrated five unique sorts of supporting frameworks and researched for the utilization in a tall structure so as to give parallel firmness lastly the streamlined plan regarding lesser basic weight and lesser sidelong relocation. A sixty-story normal molded building is chosen and broke down for twist advertisement gravity stacking. At the point when the sections are propped along the significant pivot, albeit parallel removal esteems goes past as far as possible however among the five sorts of supporting frameworks, which like the situation when segments are supported along the minor hub of twisting. K type propping brings about littler parallel relocation contrasted with different kinds. The twofold supporting gave in the focal bayous along the minor pivot of bowing of sections of a tall structure yields least weight of the structure. For propping against parallel breeze loads, twofold supporting framework was recommended.
Takahiro Atsumi, Daiki Sato, Haruyuki Kitamura, Takafumi Fujita, Mitsuru Miyazaki, Kazuhiko Sasaki, Masato Ishii and Keisuke Yoshie et al., (2008): A great deal of examines on the seismic vibration control framework display impact on alleviating harm. Most inquiries about gadgets exposed to seismic tremor ground movements have completed considering with utilizing the one kind of dampers, hysteretic or gooey one, as it were. In any case, there been hardly any examinations for the mixes various exhibitions in heading. creators have exhibited the "blend framework" which is the seismic vibration control framework utilizing both hysteretic and thick dampers in the past research. The mix framework is comprised of hysteretic (grating) dampers put on the lower accounts of the structure and gooey dampers set on its upper accounts. Joining the two dampers has seismic safety impacts due to their impacts on multipliers. This paper reports the after-effects with these dampers of the shaking table trials. The studies, using a 10-story model, were accomplished by adding a blend structure to facilitate the development of seismic management impacts. Execution of examples is explored by referring to story shear, relative story dislodging, story growing speeds and preserving dampers ' vitality. The qualities of the hysteretic dampers and the gooey dampers are well joined in the mixing framework. The aim of this paper is to check the appropriateness of the blend framework through the conservative10-story outline's shaking table trial. The mixing system consisted of hysteretic (grinding) dampers located on the casing's lower 6 accounts and the thick dampers placed on its upper 4 accounts. The expository qualities ' propensities were like the propensities of test esteems. This showed that these investigation models were sufficient to support the interpretation of the layout of this study. We affirmed that the mix framework's seismic management impacts are superior to the one-use model. The feasibility of the mixing system to lessen reactions is considered to start with the vitality intake capacity of the gooey dampers at the upper levels. Furthermore, we think that the ascent of the vitality retention effectiveness of the thick dampers results from a lift by the grinding dampers masterminded at the lower levels in the normal recurrence of the edge. It seems important to dissect the reaction decrease instrument of the blend framework from now on and into the foreseeable future in detail.
A. Jesumi1, M.G. Rajendran2 et and all,.(2013): The focus of the study was to identify the economic bracing system for a given tower height range. Five lattice towers with different bracing configurations such as the X-B, K and Y bracings for a given height range were modeled in this study. The tower heights are 40 m and 50 m respectively with a base length of 2 m and 5 m. The 40 m tower has 13 panels and the 50 m tower has 16 panels. For the tapered part, 70-72% of the height is provided and for the straight part of the tower, 28-30% of the height is provided.Geometric coordinates were used to model the structure. The angle sections are provided for the foot, diagonal bracings, and horizontal bracings. The material properties used for the study are the elastic modulus, Poisson's ratio, thickness, alpha, and damping. It was thought that a hemispheric dome was built on the

towers ' top panels. Considering that it acts as a spatial structure with pin joints, the towers were analyzed for dynamic wind loading and optimized design. The towers obtained displacements and weights were compared to reach an optimal solution.
Analytical studies were presented to find the most suitable arrangement and cost-effective bracing system of steel lattice towers for effective lateral force resistance. The joint displacement and weights are the essential parameters of the analysis. There are, however, insufficient data on the allowable tower displacement. Y bracing was found to be the most economical bracing device up to a height of 50 m from the results obtained.
S. Majid Zamania1 and A. Vafai2 (2011): In the BHRC structural engineering laboratory, the study presented experimental research program focused on y-bracing., however, are prone to instability and buckling out of plane, accompanied by low absorption of hysteretic energy. Increasingly, a quasi-static cyclic charge was applied until yield and failure occurred in the specimens. Using the capacity spectrum method, the seismic performance of the three y-braced frame specimens and a Chevron-braced frame reference was evaluated. Chevron bracing has been calculated for the. To assess internal axial forces, samples are examined as trusses. The main mechanisms considered for failure included brace buckling and the beam's plastic hinging. Their effective lengths were calculated from an Eigen value analysis to determine the buckling load of braces in compression, considering specimens as frames with moment connections. Due to the existence of single plate connections, specimen y-7 could not develop noticeable compressive resistance and therefore its lateral load capacity is based on tension in its braces. The one with single-plate gussets had the highest ductility among Y-braced versions. Chevron bracing ductility was nearly 1.7 times higher for y-braced models.

III. STRUCTURAL MODELLING

3.1 Bracing System: Braced frame system is made up of truss members as bracing components in the structure. Such bracings are widely used in laterally packed structures. We resist lateral forces mostly in compression or stress with the brace members. It makes the bracing mechanism highly resistant to lateral loads. It also makes the structure laterally stiff. With less material being added to the frame, it forms economic structure for any height.

3.2 Types of Bracings: Bracing systems are categorized according to the types of braces used in this analysis, based above attached the. The supports be classified as follows in different categories:
a) Based on materials used I braces: RCC Braces & Steel Braces
b) Based on the way braces are connected to the beam: Concentric & Eccentric Braces
c) Based on the braces configuration: V brace, K brace & X braces.



3.3 Review of Codal Provisions:
The equivalent static analysis method specified in the Indian Standard Building Code (IS 1893:2002 Part I) is based on the single response mode with simple corrections to obtain the higher modal responses. Simple normal structures are ideal for this type of system. The simplified procedures do not take into consideration for the complex structures. For complex structures or structures with irregular geometry, therefore, the dynamic analysis is the preferred method. Clause 7.8 according to IS 1893 (2002). Dynamic analysis can be carried out to obtain seismic design strength, to distribute it to different levels along the building's height, to different lateral resistant elements, for the following buildings.
a) Regular buildings — It is possible to use those in Zones IV greater than 40 m in height and those in Zones II and III greater than 90 m in height as per 7.8.4.5.
b) irregular buildings (as defined in 7.1) — All framed buildings in Zones IV above 12 m and in Zones II and III above 40 m in height.
Dynamic analysis is recommended for irregular buildings less than 40 m in height, although not mandatory. The damping value should be taken as 2 for steel buildings and the average damping is taken between 2 and 5 for the combination of steel and concrete structure.

3.4 Problem of Statement: In the construction plan, seismic zone II was used for seismic analysis of the building (G+10) with discontinuity of the diaphragm. The building's basic requirements are:

Plan Size	= 21 m x 27 m;
Beam Size	= 450 mm × 450 mm;
Column size	= 450 mm × 600 mm;
Storey Height	= 3.0 m;
Bottom storey	= 3.5 mts
Materials used	= M30 & Fe415;
Depth of slab	=125 mm
floor finish	=1.5 kN/m2;
Imposed load	=3.5 kN/m2;
Unit weight of concrete	= 24 kN/m

3.5 Modelling Methodology

i) Studied the architectural plan and, from the structural engineering point of view, aligned the structural elements.

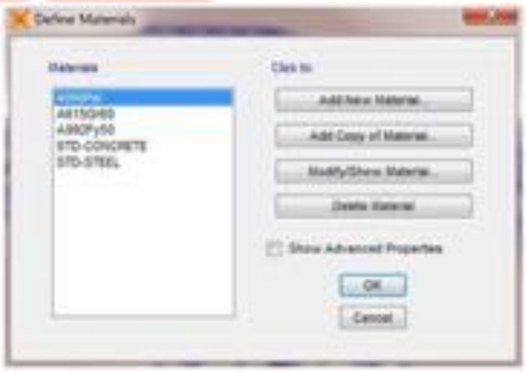
ii) Modelling the structure using ETABS with three different bracing systems.

3.6 Modelling Steps:

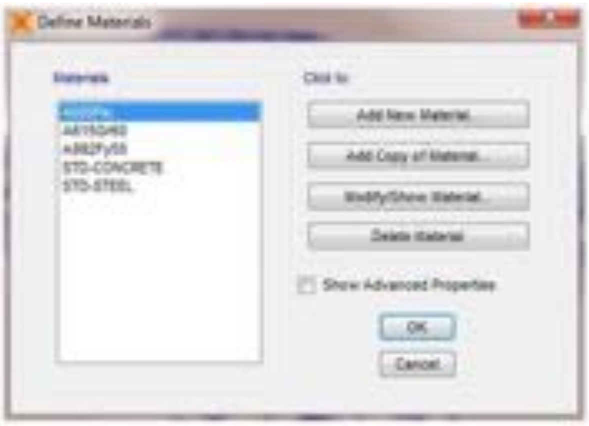
ETABS: ETABS is an advanced but user-friendly, rare purpose research and configuration software that has developed particularly to build frameworks. ETABS demonstrates a graphical interface that is instinctive and efficient in conjunction with unmatched screen, investigative and project strategies, all implemented using a standard server.

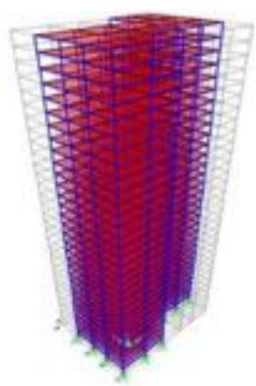
Modelling Steps in ETABS:

1. Open SAP2000 program.
2. Check the units of the model in the drop-down box in the lower right-hand corner of the ETABS window click the drop-down box to set units to KN-m.
3. Click the File menu > New model> select 3D frames.

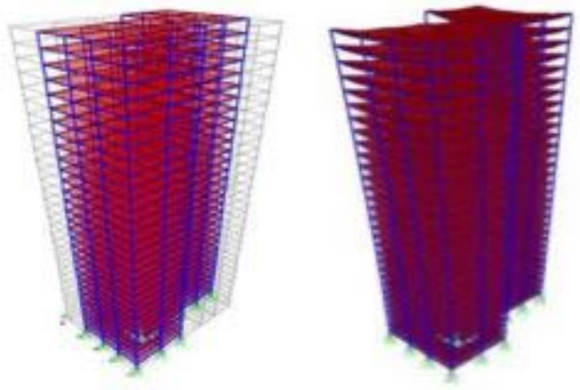


1. Click the Define menu > Material Properties: Add New Material or Modify / Show Material used to define material properties Choose the grade of steel as shown below and click OK.
2. Use Define > Frame section to define section columns and beams.
3. Attribute 0.4X0.4 beam section and 0.6X0.6 column section to the entire structure. Option above to generate the model as shown in the figure below.
4. Define various loads (Dead load, wind load, Earthquake load).
5. Dead Load: self weight multiplier is used 1 to calculate dead load as default. any other define load 1st select the member where assign this load than click the assign button.

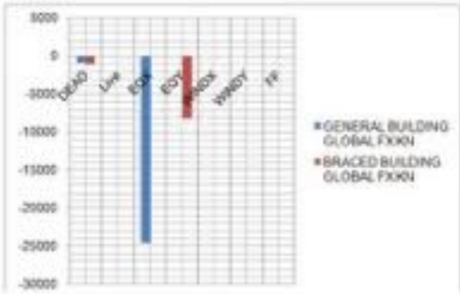




1. Assign point load and uniform distributed load Select assign point or member component by clicking the assign button The value of earthquake load in X and Y-direction was added by selecting > frame parts > Steel 0.1x0.3 and then go to assign > EQX and EQY shell loads.
2. Now, by selecting Steel 0.1X0.3 > shell area loads > wind pressure coefficient loads as shown below, the value of Wind X Wind Y has been obtained similarly.
3. Delegate support condition Drop-down box in the bottom right corner of the ETABS window to delegate fixed support by assigning > Joint / Point > Support order.
4. Analysis run > Analysis run order.



IV. RESULTS AND ANALYSIS

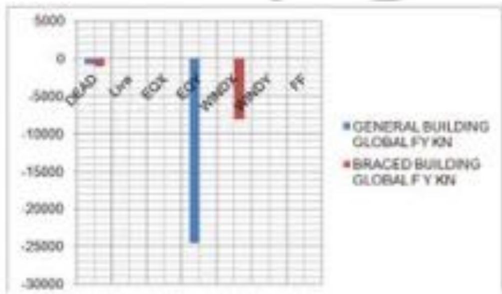


FORCES IN X DIRECTION

output case	GENERAL BUILDING	BRACED BUILDING
	GLOBAL FX KN	GLOBAL FX KN
DEAD	-768	-960
Live	3.96E-09	-8.52E-10
EQX	-24546.76	-2.84E-10
EQY	2.37E-07	-8096.214
WINDX	0	-2.27E-11
WINDY	0	0
FF	0	0

4.1 Base Reactions: A basic reaction is the reaction force / force attributed to the system support, i.e. if the system is a chair, and the external inputs exerting significant forces on the chair are the Earth (gravitational force) and the floor(' normal' force; normally used here to describe a force perpendicular to the floor surface); Then the forces of "supporting reaction" are the normal forces on each chair leg. This is an example of a support reaction, but there are many examples of supports that have different characteristics of reaction, and in mechanics it is very important to understand how to model these forces of reaction. For reference, here is a useful diagram that somebody made showing some of these supports that are characterized by the way they are modeled:

From the above graph it is absorbed that the Earthquake in Y direction in global FX in general buildings is more in the same direction compared to the braced structure, and dead loads are observed to be minimum in general buildings compared to the braced building.

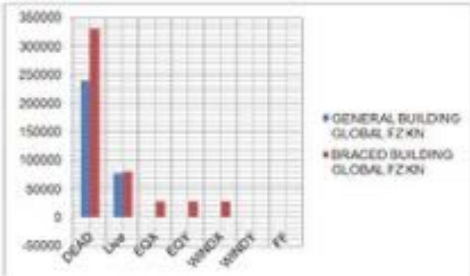


I. FORCES IN Y DIRECTION

output case	GENERAL BUILDING	BRACED BUILDING
	GLOBAL FY KN	GLOBAL F Y KN
DEAD	-768	-960
Live	-4.14E-10	-1.63E-10
EQX	2.02E-07	-5.40E-11
EQY	-24546.76	2.15E-09
WINDX	0	-8096.214
WINDY	0	0
FF	0	0

1. FORCES IN Z DIRECTION

output case	GENERAL BUILDING	BRACED BUILDING
	GLOBAL FZ KN	GLOBAL FZ KN
DEAD	240182.01	330047.255
Live	76880	80538
EQX	-9.48E-10	26846
EQY	-2.29E-09	26846
WINDX	0	26846
WINDY	0	0
FF	0	0



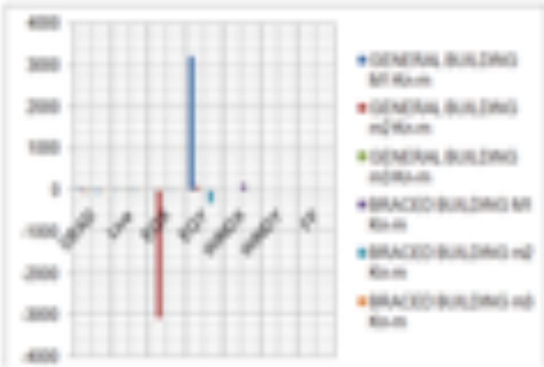
From the above graph it is absorbed that the earthquake in Y direction in global FY in general buildings is more in the same direction compared to the braced structure, and dead loads are observed to be minimum in general buildings compared to the braced building.
From the chart above, it is absorbed that the earthquake in Y direction in global FY in general buildings is more like the braced structure in the same direction, and dead loads are found to be minimal in general buildings relative to the braced house.
4.2 Joint Reactions: A reaction is a force exerted on an object by a support: sometimes called a common reaction.

1. FORCES IN BOTH GENERAL AND BRACED BUILDIN

joint text	output case	GENERAL BUILDING			BRACED BUILDING		
		F1 Kn	F2 Kn	F3 Kn	F1 Kn	F2 Kn	F3 Kn
1	DEAD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	Live	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	EQX	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	EQY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	WINDX	0	0	0	[illegible]	[illegible]	[illegible]
1	WINDY	0	0	0	0	0	0
1	FF	0	0	0	0	0	0

1. MOMENT FORCES IN BOTH GENERAL AND BRACED BUILDING

joint text	output case	GENERAL BUILDING			BRACED BUILDING		
		M1 Kn-m	M2 Kn-m	M3 Kn-m	M1 Kn-m	M2 Kn-m	M3 Kn-m
1	DEAD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	Live	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	EQX	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	EQY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	WINDX	0	0	0	[illegible]	[illegible]	[illegible]
1	WINDY	0	0	0	0	0	0
1	FF	0	0	0	0	0	0

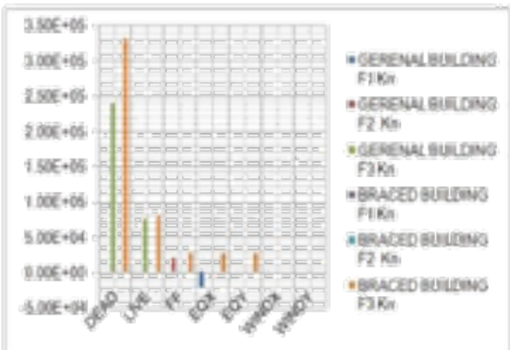


From the chart above, it is inferred that force due to death is high in force in the 3rd direction compared to the general and braced buildings, and that the live load is also lower in the 3rd direction in the general building than in the braced building. Earthquake inx direction is also measured higher in negative direction and then strength in 3rd direction.
From the above graph it is concluded that:
1) In earthquake in y direction, the moment is positively strong in 3rd direction relative to braced tower.
2) The moment is negative in the second direction of the earthquake inx direction compared to the braced building with general construction.

4.3 SECTION CUT FORCES

1. FORCES (F1,F2,F3)

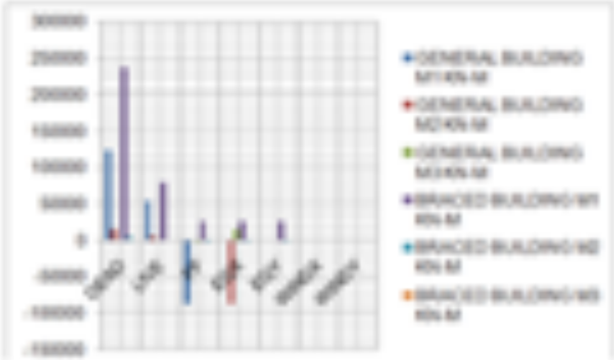
SECTION CUT TEXT	OUTPUT CASE	GERENAL BUILDING			BRACED BUILDING		
		F1 Kn	F2 Kn	F3 Kn	F1 Kn	F2 Kn	F3 Kn
SCUT3	DEAD	8.90E-09	2.63E-08	240950	-1.71E-09	2.42E-10	331007.3
SCUT3	LIVE	-1.17E-10	-3.82E-09	76880	-2.23E-10	-1.10E-10	80538
SCUT3	FF	1.87E-07	21638.35	-1.45E-10	-4.66E-11	-2.53E-11	26846
SCUT1	EQX	-21638.4	-3.29E-07	2.33E-10	1.25E-09	4.90E-09	26846
SCUT3	EQY	0	0	0	-1.78E-08	-4.27E-10	26846
SCUT3	WINDX	0	0	0	0	0	0
SCUT3	WINDY	0	0	0	0	0	0



Section cutting forces in 3rd direction are high due to dead load in braced building compared to the general building and live load forces in both 3rd direction are similar. The floor load in 2nd direction is high in the general building compared to the braced building, and the ground shakex direction also has negative forces in F2.

I. MOMENTS (M1,M2,M3)

SECTION CUT TEXT	OUTPUT CASE	GENERAL BUILDING			BRACED BUILDING		
		M1 KN-M	M2 KN-M	M3 KN-M	M1 KN-M	M2 KN-M	M3 KN-M
SCUT1	DEAD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCUT1	LIVE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCUT1	FF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCUT1	EQX	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCUT1	EQY	0	0	0	[illegible]	[illegible]	[illegible]
SCUT1	WINDX	0	0	0	0	0	0
SCUT1	WINDY	0	0	0	0	0	0



Section cutting moments in 3rd direction is high due to dead load in braced building compared to the general building and living loading moments in both 3rd direction is similar. The floor load in 2nd direction is low in general building compared to the braced building, earth quake x direction is also negative high in forces.

V. CONCLUSION

The following conclusions were drawn from the above study:

1. For General Buildings in X-Direction and Y-Direction, a base reaction has higher values where there are higher values for the Braced buildings as in the case of Z-Direction.
2. In the X and Y Direction Shear force values are lower for the Unsymmetrical Braced where, as in the Z Direction, the Unsymmetrical Braced values are higher.
3. Moments in X-Direction, Y-Direction, for General Building, Z-Direction have higher values.
4. Thus the Braced Buildings have less quality than the General Buildings of the Bending Moments.
5. For general structures, joint reactions have higher values than braced buildings, so the Unsymmetrical Braced model is generally preferable)
6. For the Unsymmetrical braced structures, there are lower values of section cut forces for the forces (F1, F2, F3) than for the General buildings.
7. There are also lower values for the Moments (M1, M2, M3) than General Buildings for the Unsymmetrical braced structures.

REFERANCES

[1] [illegible]

[2] [illegible]

[3] [illegible]

[4] [illegible]

[5] [illegible]

[6] [illegible]