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Dynamic Analysis of Multistorey Building using Response Spectrum Method and Seismic Coefficient Method – A Comparison

Suchi Nag Choudhary[1], Dr. P.S. Bokare[2]
[1]Post Graduate Student, Dept. of Civil Engineering, [2]Principal
RSR Rungta college engineering and technology Bhilai, India

Abstract - Earthquakes are very disastrous and cause a great harm to living life, material life and buildings. Hence proper dynamic analysis for building having earthquake threat is needed. This will ensure proper designs resulting in an earthquake proof structure. Different dynamic investigation techniques are accessible for tremor examination of multi-storey structures which are response spectrum method (RSM), seismic coefficient method (SCM), time history strategy and Codal provision technique (CPT). Many authors tried to study analysis of multi- storied structures using one or the other method stated above. However, there is no consensus on the particular method being the best one. The most popular among them being Seismic Coefficient Method and Response Spectrum Method. This study aims at reviewing few of the available research reports on analysis of multistore building using RESPONSE SPECTRUM METHOD and SEISMIC COEFFICIENT METHOD. A comparison of dynamic analysis of multistore building for earthquakes is presented. It was found that only few authors could present a faint idea of comparison of various methods for earthquake analysis of multistore building. The present study suggests that the Response Spectrum Method, which is widely used for analysis of multistore buildings and incorporated in most of the codes related to earthquake analysis of buildings, is found most suitable for earthquake analysis of multistore buildings by most of the authors.

Keywords – Dynamic analysis methods, Response spectrum method (RSM), Seismic coefficient method(SCM), Multi-storey building, Comparison of reviews

I. INTRODUCTION

Right from the evolution of the earth, Earthquakes has caused great disasters in the form of destruction to property, injury and loss of life to the population. The powerful outline and development of seismic safe structures has significantly more prominent significance in this nation because of quick modern improvement and grouping of populace in urban areas.

Seismic design approaches are stated to ensure that the structure be able to resist minor and frequent shaking intensity without causing any damage. Earth suffers sudden shaking due to tectonic plate movement, volcanic eruption and some artificial causes as nuclear reaction or explosions.

Occurrence of earthquake is a devastating phenomenon causing huge damage to properties and unaccountable loss to property. Hence, the buildings should be dynamically analysed for earthquake forces to avoid the damage. Various methods available for dynamic analysis of structures include;

A. Response spectrum method (RSM)
B. Seismic coefficient method (SCM)
C. Time history method (THM
D. Indian standard code method

Out of above method RESPONSE SPECTRUM METHOD and SEISMIC COEFFICIENT METHOD are widely used for the dynamic analysis of structure. Hence this study aims at reviewing literature available on the use of these methods of dynamic analysis of structure. This study is divided in four sections; section one Introduction and then comes the literature pertaining to response spectrum method and the third section deals with seismic coefficient method. Fourth and last section dedicated to conclusion of this study. Selective references are included at the end of this report.

II. LITERATURE REVIEW

A. Response Spectrum Method (RSM)

A response spectrum method is straight forward graphical portrayal of unfaltering state reaction for dislodging, speed or quickening of oscillators of fluctuating normal response that are forced into motion by the same base vibration. To perform response spectrum method analysis to any building it is necessary to know the earthquake intensity at zone on which the building.

1) Application of RSM:

a) In RSM earthquake acceleration acts as input and pseudo velocity and response spectrum is calculated. RSM gives valuable information about period at which maximum acceleration can be expected during any earthquake.

b) RSM defines the intensity and time period of seismic force that affects the structure.

c) RSM is a design tool to ensure and design the safe structure considering the total response of earthquake.

2) Advantages of RSM over other Methods:

a) Calculation is reduced as compared to any other dynamic method.

b) Examination of mode shape and design of structure period which makes the design safe at designer point of view.

c) Earthquakes records in this method are independent by considering 3 modes of response to any individual structure.

d) RSM considers building as a flexible structure having lumped mass at floor level

3) Mehul J. Bhavsar, 2014, Studied and clarified in R.C. structures, edges are considered as fundamental basic components, which oppose shear, moment and torsion successfully. These edges are subjected to assortment of loads, where parallel loads are constantly dominating. In perspective of the request of such codes over the creating nations like India, an endeavor is made to contrast EURO gauges and Indian measures utilizing auxiliary programming. This paper finished up by looking at all torsion twisting and shear under gravity and also seismic stacking. That the outline base shear according to IS 1893 is lower when contrasted with EUROCODE 8 in view of higher estimation of RESPONSE REDUCTION FACTOR. The permissible story float according to EURO CODE 8 is 1.5%.while according to IS 1893 is 0.4%. The maximum percentage of steel required, suggested by IS 456 in the column is 6% while that suggested by EC 2 is 4%. The ductility of column in EC 2 is controlled by modulus of elasticity while that in IS 456 is controlled by area of reinforcement.

4) Guobin Yan, 2010, analysed past data of blasting vibration by plotting response spectrum curve and explained all modern methods practicing to reduce those forces. Blasting vibration are independent and are measured under single parameters, velocities are generated due surface speed, acceleration and displacement. Due to blasting forces the dynamic property of building gets affected. According to vibration speeds building structures are separated for security measures under BLASTING SAFETY REGULATIONS (GB6722-2003). Guobin Yan disclosed that harm to any building is brought about by impacting strengths as well as normal for building.

5) Jaime Landingin, 2012, looked at the seismic arrangements of the three seismic outline codes, specifically the Philippine code NSCP2010 (National Structural Code of the Philippines), the European code (Eurocode 8), and International Building Code IBC 2009to the most common ordinary residential building of standard occupancy. The response spectrum function of NSCP 2010 was considered for the horizontal load action with different load combinations. Response spectrum analysis was performed using SAP2000 software package. A comparison of NSCP 2010, EC8 and 2009 IBC has been presented focusing on the building base shear, story shear profile and column axial load - bending moment interaction diagrams in the standard occupancy of RC buildings. The structural model for the RC frames were created using SAP2000. The results for maximum base shear, story shear, axial loads and bending moments were compared and obtained using the NSCP 2010 response spectrum function. It can also be noted that in the load combination cases, EC8 considered the effects of earthquake actions in both directions and this was not considered in the NSCP 2010 and 2009 IBC.

6) Jun Chen, 2016, clarified the impact and reaction of floor acceleration because of seismic forces. He explained that due to seimic forces there is a jumping occurs n the floor. An experiment was conducted on individuals by taking jumoing forces and taking 506 records. Every individual was considered as single degree freedom system with varioing frequency and damping ratio calculated using response spectrum method and after a curve was plotted as per the results obtained and design spectrum curvewas obtaine by statistical. The design spectra considered 0.5hz-15 hz. The experiment and analysis conducted under various floor models and concluded that response spectrum varies as per existing floor design to any individual or crowd.

7) Khaldoon A.et.al,2017,compared time history method and response spectrum method and explained that for non linear dynamic analysis response spectrum method is adopted. He considered all past earthquakes records,spectrum records. Study main focused structure design of two multistory building built to resist earthquake in two different areas in Kabul. Analysis and

comparision is done by creating an artificial field of seismic forces. All method are compared by modelng those building and analyse under various loding conditions by creating artificial accelerograph. The paper cocluded that various modification are required under time history analysis and accelerograph.

8) Lukas Moschen, 2016,paper represented method of response spectrum for peak floor response of any structure. The analysis is done by modal which is prepared under compleate quadetric combination. He also explained the concept of stochastic base excitation for various high rise building. Method has been tested multistoried structures at various planes but with perticular ground motion Technique embraced both flexible and inelastic structures all the while. Paper comapes modern quadretic rule with modal displacement for calculation. In this paper all present day technique and mix of strategy are considered

9) Mahmoud M. Hachem, considered utilization of ground movement records in the seismic plan of structures is ending up noticeably more broad because of the expanding accessibility of ground movement record databases and enhancing figuring power. Contingent upon the construction law and structure included, the specialist may be required to perform one or a mix of many sorts of seismic examinations including reaction range investigation, nonlinear sucker investigation, and straight or nonlinear reaction history investigation. The genuine procedure took after is frequently an element of the individual understanding of the seismologist or design, and is affected by nearby normal practice and the elucidations of building offices and companion survey advisory groups. Seismic outline criteria and ground movement determination techniques from five diverse world locales were introduced and looked at. Reaction history investigation is infrequently utilized in practice, so the code arrangements for this sort of examination are in some cases dubious and a few choices are incidentally left to the creator. All codes appear to permit ground movement alteration utilizing unearthly coordinating, and mimicked ground movements give off an impression of being for the most part acknowledged.

10) Kumar, researched different level of ductility in a building can be considered by using different response reduction factor in linear analysis however, the actual non-linear behavior of the building cannot be predicted on same basis. The seismic performance of low-rise and midrise RC buildings designed as per Indian codes with consideration of seismic forces with two sets design levels SMRF and OMRF and only gravity forces designed for only gravity loadings have been evaluated by fragility relationships. The inner powers are figured from flexible examination. It can likewise be expressed as the harm potential to a class of comparable structures in a specific building shock subjected to a given seismic hazard. With a specific end goal to recreate these three gatherings of structures, three outline levels have been considered for this review i.e. the building is designed as Special Moment Resisting Frame (SMRF) Ordinary Moment Resisting Frame (OMRF) and for gravity loads only. The response reduction factor (R) is based on ductility, over-strength and redundancy effects and thus requires the proper detailing of structure. Even though the design base shear observed for OMRF building was higher than the SMRF building, the ductility capacity was observed higher in case of SMRF building. The ductility capacity of building designed as SMRF was observed 30 %more than that of building designed as OMRF.

B. Seismic Coefficient Method (SCM)

Seismic coefficient method (SCM)is a static method to evaluate and design an earthquake resistive structure. Seismic coefficient method considers all horizontal as well as vertical forces for calculation and analysis. Stability and deformation of structure and also stress and strain generated are calculated against both horizontal as well as vertical forces accompanied with self-weight of structure.

1) Application of SCM:

a) During analysis of this method earthquake motion is replaced by constant horizontal acceleration.
b) Seismic effects of any structure with lateral forces and soil condition are calculated and analysed
c) Analysis of seismic forces to each floor can easily be calculated
d) Base shear is divided along the height of building during analysis
e) Method determine the function of magnitude of earthquake

2) Advantages of SCM over other Methods:

a) The method is to understand.
b) Method is applicable for analysis of effective stress slope stability.
c) Method ignores the consideration of natural earthquake cycle.
d) Method always assumes additional static force is applied on slopes due to earthquakes.

3) Yan Zou, 2017,explained the method of analysis of underground structure using seismic coefficient method. Seismic design for

underground structures are based on elastic hypotheses,study also proposed improvement called PSEUDO-STATIC Analysis for finite element method for nonlinear behaviour of underground structures. Seismic analysis of soil layer is done by calculating shear stress and displacement along the depth of layer and by ploting a stress-strain backbone curve. During this analysis soil is considered as homogeneous and isotropic showing same othe property. The method proposed is used for nonlinear performance of underground structures.method also explained potential method about ground surface to design asafe framed structure.

4) Jorge Ruiz-García, 2013,investigated strategy for seismic coefficient for existing structure on delicateor soft soil. Investiagted was led on four steel casings and six RC framed under 20 distinctive seismic stacking condition and horizontal uprooting is analysed. Analysis concluded the effect of seismic response of building depends on ratio of period of vibration of structure with respect to the ground motion also concluded that seismic coefficient method is used to estimate maximum roof diplacement in any ineastic structure and accurate result is obtained when comapred to statistics method.

5) S.Karthiga, 2015, Analysed and designed G+10 building for seismic forces using four international building standards- IS1893, Euro code 8, ASCE7-10 and the British Codes differs significantly in various parameters specified. The examination of the building was done utilizing STAAD.Pro.V8i. The building was then outlined according to the predefined codes. Since the effect of seismic forces on structures is quite significant, it is important that the design of the structures must be done in the best possible way to take into account these effects and thereby aiming for an adequate structural response. With the variations in parameters the performance of the building varies. The examination and plan of the G+10 building was done utilizing programming and additionally physically. It was reasoned that the Euro Code guidelines served to be the more economical and the Indian Standards were the minimum efficient. A pushover analysis was performed on the building using SAP2000 to check the performance of the building.

6) Tatheer Zahra, investigated and compared the design of a high rise reinforced concrete building in different seismic zones. A 30 storied building was modelled in ETABS software and analysis was done for forces in low (seismic zone 1), moderate (seismic zone 2a, 2b) and high (seismic zone 3, 4) categories and applied forces were compared**.** The results showed that the members designed for moderate seismic zone were inadequate for higher seismic zone categories**.** Shear wall in critically loaded areas that were performing well in low and moderate zone needed to be re-designed for high seismic zone categories. The rc buildings which are analysed and designed to sustain low and moderate seismic events are not safe for seismic events of higher category and run the risk human lives and massive devastation. In this study, a high rise building was analysed in different seismic zone risk categories and was designed for moderate zone 2b (Karachi region).

7) P.P.Tapkire, 2013, compared the design of High rise RCC buildings by using Indian Standards and European Standards under gravity loading as well as seismic loading. In R.C. structures edges are considered as principle auxiliary components as they oppose shear, moment and torsion viably brought about by assortment of loads where sidelong loads are constantly dominating. Buildings with regular or irregular plan configuration may be modelled as a system of masses lumped on floor levels with each mass having one degree of freedom that of lateral displacement in the direction under concern. Undamped free vibration analysis of entire building can be analysed as building is modelled as spring - mass model shall be performed using suitable masses and elastic stiffness of the structural system. The comparison of several analysed seismic standards indicates a general agreement regarding the desired main characteristics of seismic resistant structure such as simplicity symmetry, uniformity, and redundancy.

8) Vinit Dhanvijay, 2015, concentrated on firmness of working with bracings and shear divider and execution of the G+15 building is broke down in Zone II, Zone III, Zone IV, and Zone V. The research focused understanding the main factor that leads the structure to perform poorly during earthquake in order to achieve their appropriate behaviour under future earthquakes. The modelling and analysis of structure G+ 15 ordinary RC moment-resting frames (OMRF) done in STAAD-PRO-V8i. The extent of present work is to comprehend that the structures need reasonable Earthquake opposing components to securely oppose vast parallel powers that are forced on them amid Earthquake. Shear walls are efficient, both in terms of construction cost and effectiveness in minimizing Earthquake damage in structure and the braced frames has tendency to absorb great degree of energy exerted by earthquakes. A comparative analysis is done in terms of Base shear, Displacement, Axial load, Moments in Y and Z direction in columns and shear forces, maximum bending moments, max Torsion in beams.

9) Banarase, 2015, reviewed literatures of various researches. The paper gives more information about the static and dynamic analysis done on various types of structures using various codes. The use of software in seismic analysis will reduce the time consumption and errors in analysis and design of the structure. This work aims at the comparison parameters such as

displacement, base shear, story drift, time period, axial and shears force bending moment of various provisions for earthquake analysis as given in building codes of Indian Code, American code, European code, New Zealand code is carried out by Response spectrum analysis and modelled with the help of ETAB2015 software. The above research papers give following conclusions The building designed using Euro code performs better comparing to Indian standard (IS1893:2002) and American (ATC40 and FEMA440) codes. Hence Indian and American code needs improvement in performance based design.

10) Pamela Jennifer J P, 2015, Seismic design deals with the yielding and inelastic behaviour of structural element which is detailed to exhibit such behaviour during earthquake. The structure is designed with sufficient strength to behave elastically during earthquake. In this paper writings of different investigates were considered and gave more data about the static and element examination done on different sorts of structures. The utilization of programming's in seismic investigation will decrease the time utilization and mistakes in examination and plan of the structure. The building composed utilizing Eurocode performs better contrasting with Indian standard (IS1893:2002) and American (ATC40) and FEMA440 codes. Indian and American code needs change in execution based plan. Outline with shear divider performs better and the base shear increased by 9.82% when compared to the frame without shear wall. Shear wall performs better to lateral displacement and it reduces by 26.7% when compared to the frame without shear wall.

11) Noor M.A, 1997, has reported the comparative study of various codes in Bangladesh. Their main objective was to compare some sections of seismic design forces which occur to any building. They compared different codes with uniform building code (UBC) 1994 editions, IS Indian Standard Code, 1984 editions, NBC National Building Code, 1995, BSLJ building standard law japan 1987.Comparison of different parameters of zone factor, importance factor, structural system factor, soil characteristics, site geology, base shear and time period was undertaken. If there should arise an occurrence of solid building, middle and common moment opposing casings are broke down. Amid unearthly examination, just short course of building has been chosen and worldwide degree is bolted to other heading. Unearthly speeding up was connected towards the short measurement of building. The mode shape, transverse to the heading and torsional mode shapes had no mass interest calculate.

They reasoned that every one of the codes (specified above) receive a comparable definition for different coefficients in the condition of base shear in the equal static technique. The immediate correlation of seismic strengths was impractical since there are vast contrasts in the seismic force from nation to nation which brought about contrasts in configuration esteem for zone consider. The primary limitation of the technique was utilization of equal static strategy. In each code general and unpredictable structures of certain tallness can be broke down by identical static load strategy.

12) Asmita Ravindra Wagh, 2016, thought about the plan of high ascent structure with various International codes**.**The objective of this study is to investigate the differences caused by the use of different codes in the analysis of a High-Rise building under following parameters such as displacement, base shear and story drift, time period, axial and shear forces, bending moments are studied using different codes. In R.C. buildings, frames are considered as main structural elements, which resist shear, moment and torsion effectively. These frames are subjected to variety of loads, where lateral loads are always predominant. Looking at the recent literature and structural standards; it is possible to try to provide the best practice for the seismic design of high-rise buildings. From the study of papers presented above, it is observed that the traditional design codes are not suitable for the design of high-rise buildings for various reasons. The codes permitted only a limited number of structural systems for buildings taller than 49m in height, thus not being economical for buildings of significantly greater height. This approach of comparative study based on the design and seismic analysis of the building will act as a check as to which code serves to be the most economical.

13) Mourad M. Bakhoum, 2016, Structural outline codes of various nations give engineers information and methodology for plan of the different structural components Building design codes from USA, Europe, and Egypt are considered. Comparisons of the provisions for actions loads, for the strength of sections in flexural and compressive axial loading are carried out. The considered parameters in the study include the following Permanent actions (D.L.), variable actions of buildings (L.L.), Types of building occupancy for variable actions residential, offices, and shops and Action effects flexural and axial forces. It was shown that comparing variable actions and ultimate resistance of sections separately is useful; however, including the combined effect of both actions and resistances as stipulated by different codes is crucial for better comparison.

14) S. H. C. Santos**,** centered in outline criteria for structures. The Western border of South America is a standout amongst the most seismically dynamic areas of the World**.**This study is focused in some critical topics as definition of the recurrence periods for establishing the seismic input, definition of the seismic zonation and design ground motion values, definition of the shape of the design response spectra, consideration of soil amplification and soil liquefaction and soil-structure interaction, classification of

the structures in different importance levels. On the other hand, apart from the already discussed very particular case of the Eurocode 8, differences in the shapes of the design spectra lead to differences in the results, in some cases, superior to 50%. Clearly, this is indicated to be better analysed in future similar reviews. In a portion of the norms, as the Colombian code, the outline of design requirements are very well detailed, it is seen the absence of definition in some important perspectives. It is suggested that these prerequisites ought to be finished later on modifications of these principles.

15) M. Dana, 2014, The 2013 California Building Code requires that the vertical component of an earthquake be accounted for in almost all building analyses and designs. This study provides a comparison between code-prescribed pseudo-static vertical seismic forces and the results of a non-linear response-history analysis that incorporates vertical ground motions. It was found that the code approach underestimates the interior column compression demands by as much as 40% with an average of almost 20%. For interior beam demands, the positive moments at the face of the columns were lower for the code approach compared to the explicit.

16) G.R.Searer, examined five of the most recent changes to the code the vertical earthquake component, the seismic design of non-structural components and equipment, the maximum inelastic response displacement, the use of 2/3 of the maximum considered earthquake and the reliability/redundancy factor. Uniform Building Code (UBC) through the 1997 UBC to the 2000 International Building Code (IBC). Look into considered vast number of changes to the construction law, the following sensible stride is to address whether these progressions were helpful or negative to the general routine of basic designing. Computed values for the outline shear fluctuated by over 200%, even shear strengthening changed by over 800%, and longitudinal limit fortifying shifted by over 900%.The study concluded that in general, even experienced practicing engineers are unwilling or unable to follow the complexities in the current building code

17) Er.Pujan Neupane, 2015, Structural design engineers in Nepal use seismic codes of Nepal and India interchangeably, although the codes yield different design values. The hypothesis for calculation of seismic strengths in the two codes is sensibly uniform, it considers a sound relative investigation. The result of the investigation gives enough proof to out-run such a general proclamation, to the point that Indian seismic codes are more traditionalist than Nepali seismic codes. All building codes have their own principles, so it is not wise to mix the requirements of one code with another. Indian seismic code was prepared on the basis of deterministic seismic hazard analysis from historical data of past earthquakes whereas Nepali seismic code was prepared on the basis of Probabilistic seismic hazard analysis of all faults Within 150 km boundary of Nepal. After accounting all such factors, it can be concluded that for RC buildings resting on stiff or medium soil, the seismic demand as computed using IS 1893 is always higher than NBC 105. The structural engineers should not just stick to code compliance but should start designing more resilient, redundant, collapse preventive and better performing structures in future.

18) Livaoˇglu, 2006, explained the necessity of revision and updating earthquake codes depending on the improvements in the representation of ground motions, soils and structures. These revisions have been more frequently seen in recent years. One of the key changes in earthquake codes has been performed on the design spectra. The main purpose of this study is to investigate the differences caused by the use of different codes in the dynamic analysis and seismic verification of given types of buildings located at code defined different sites. Base shears, lateral displacements and understorey drifts for the analysed buildings located at code defined ground type are comparatively presented. The biggest change related to the design spectra from the codes to the IBC is in the design ground motion parameters. EC8 presents an annex for elastic displacement spectrum for periods of long vibration period. There are significant differences between the three codes (TEC, UBC, and EC8) and IBC&FEMA seismic design provisions. The biggest change related to the design spectra from the codes to the IBC is in the design ground motion parameters, now SDS and SD1, rather than seismic zone factor.

19) V.Vratsanou, 2000, compared study of the European seismic codes for the case of residential buildings, whose structure system consists of bearing pain unreinforced. As a result of currently used seismic design philosophy for building structures that accept structural damage in the event of severe earthquake Ground motions, design lateral forces are lower, and in some cases much lower than those required to maintain the structure in the elastic range. To avoid complicated nonlinear structural analysis in design, the energy dissipation capacity of the structure, mainly through ductile behaviour of its elements or other mechanisms, is taken into account by performing a linear analysis based on a response spectrum, which is reduced with respect to the elastic one and henceforth called "design spectrum. The scope of this paper to point out the need for harmonization in the case of masonry structures. Due to their rationality EC 8 combined with EC 6.

20) Musmar, 2007, concentrated fairly distributed rendition Jordan Seismic code (JSC) and how the disadvantages of the old form are outperformed. The new JSC code violates the old arrangements, in that info parameters now have articulated and

noteworthy physical implications. The new JSC code contains conditions and strategies for seismic constrain computation for structures subjected to quake excitation. It additionally displays seismic plan techniques for various auxiliary components notwithstanding the best possible enumerating to guarantee basic trustworthiness. The new JSC code gives V/W values that are lower by 40% to half than that of the old JSC code, contingent upon the time of the structure. It also failed to cover major issues regarding earthquake impact, structural response or constructional provisions and detailing to assert ample structural integrity upon earthquake action.

21) Robin Davis P, Studied and evaluate the seismic risk of the OGS buildings in terms of fragility curves and reliability indices. Limit states define the capacity of the structure to withstand different levels of damage. Present study is an attempt to study the performance in a probabilistic framework, of a typical four storied open ground story (OGS) building designed with multiplication factor (MF) suggested by various international codes. The above objective, the OGS frames are designed considering MF values suggested by IS 1893 (2002), Bulgarian seismic design code (1987), SII (1995) and EC 8 (1996).The open ground story building designed with no multiplication factor (OGS) is found to be more Vulnerable than Bare Frame (BF) and Fully Infilled The scheme of application of MF in both open ground story and adjacent first story suggested by SII (1995) is found to be a better solution compared Frame (FF).

22) Mistumasa Midorikawa, Presents the seismic design code of buildings in Japan revised in June 2000 toward a performance-based structural engineering framework. The code provides two performance objectives: life safety and damage limitation of a building at two corresponding levels of earthquake motions. The seismic performance shall be verified by comparing the predicted response values with the building's estimated limit values. The verification procedures for seismic performance against the design earthquake motions in the new code are in essence a blend of the ESDOF modelling of a building and the site- dependent response spectrum concepts, and the application of a nonlinear pushover analysis and the modal analysis. The new procedures make possible the prediction of the maximum structural response against earthquake motions without using time history analysis.

23) Wadud, 2001, analyzed different arrangements for seismic tremor and twist examination as given in construction laws of various nations. Fundamentally Bangladesh National Building Code, 1993 (BNBC-93) has been contemplated and contrasted and uniform Building Codes, 1991 and 1997 (UBC-91 and UBC-97), National Building Code of India, 1983 (NBCIndia-83), and Outline Code of Bangladesh, 1979. The review uncovered that the created nations have expanded the component of security against quake by recommending higher estimations of base shear. Bangladesh lies on a dynamic seismic zone and is inclined to significant quakes. Be that as it may, the tremor configuration arrangements in BNBC-93 are minimal moderate among the present codes looked at in this paper. This may hamper the trustworthiness of the structure and cause genuine death toll and properties if there should arise an occurrence of a noteworthy seismic tremor. This requires a more moderate approach in the seismic plan of the structures in Bangladesh. Additionally, wind burdens ought not be overlooked and ought to be legitimately cooked for in the plan of medium to elevated structure structures**.**

24) A.K. Chopra, 2014, concentrated a building outline without shear divider and with shear divider is composed according to Indian standard i.e. IS 456:2000 and IS 1893:2002. Sucker investigation is a static, nonlinear method utilizing disentangled nonlinear procedure to appraise seismic auxiliary disfigurements. The examination includes applying flat loads, in a recommended example to the structure incrementally, i.e. pushing the structure and plotting the aggregate connected shear constrain and related horizontal relocation at every augmentation, until the structure or crumple condition**.**In technique a computer model of the building is subjected to a lateral load of a certain shape. The pushover analysis of the building frame is carried out by using structural analysis and design software SAP 2000. It can be concluded that the provision of shear wall to building frame increases the rigidity of the Structure, reduces the base shear , story displacement and story drift because increase in the period of the Structure.

25) John Holmes, 2009,The paper describes a comparison of wind load calculations on three buildings using fifteen different wind loading codes and standards from the Asia-Pacific Region. The low-rise building is a typical steel portal-framed industrial warehouse building assumed to be located in a rural area. The design wind speeds at the top of each building, and other wind properties such as turbulence intensity were prescribed. The comparisons showed varying degrees of agreement. The coefficient of variation for the results for the low-rise building (Building 1) is somewhat large, considering its comparative simplicity as opposed to the complexities in the Buildings. The high-rise building (Building 3) has a significant amount of resonant dynamic response to wind which complicates the evaluation of base shear, bending moments and acceleration at the top of the building.

III. CONCLUSIONS OF LITERATURE REIVEW

The litrature review presented above indicates that no author has under taken the comparative study of use of response spectrum method and dynamic analysis method for earthquake analysis of multistory structure. However following conclusions can be drawn after studying existing research reports on dynamic analysis of multistoried building for earthquake.

A. To reduce the response reduction factor 6% of steel is required in columns.

B. Any building suffers damage is not only caused by blasting vibration forces but also due to characterstic of building under goes damage.

C. Affect of response of seismic forces to any individual , crowd or any structural building depends on type of floor on the stand.

D. For non linear dynamic analysis time history method and response spectrum methods are compared and concluded as various modifications are required in accelerograph in time history method and response spectrum is accurate method for non linear dyanamic analysis.

E. RSM can for both elastic and inelastic also be calculated by artificial modling structures under combine quadartic combination

F. For different ductility different response reduction factor are considerd.

G. Seismic analysis of soil layer is done by calculating shear stress and displacement along the depth of layer and by ploting a stress-strain backbone curve.

H. SCM is used to estimate maximum roof diplacement in any ineastic structure and accurate result is obtained when comapred to statistics method.

I. Using softwares realted to seismic analysis makes analysis more accurate and is easy and takes less time to find results.

J. Various codes are studied for analysis of seimic forces but every code as per time need to be reviesed and none of the code can be used for different area.

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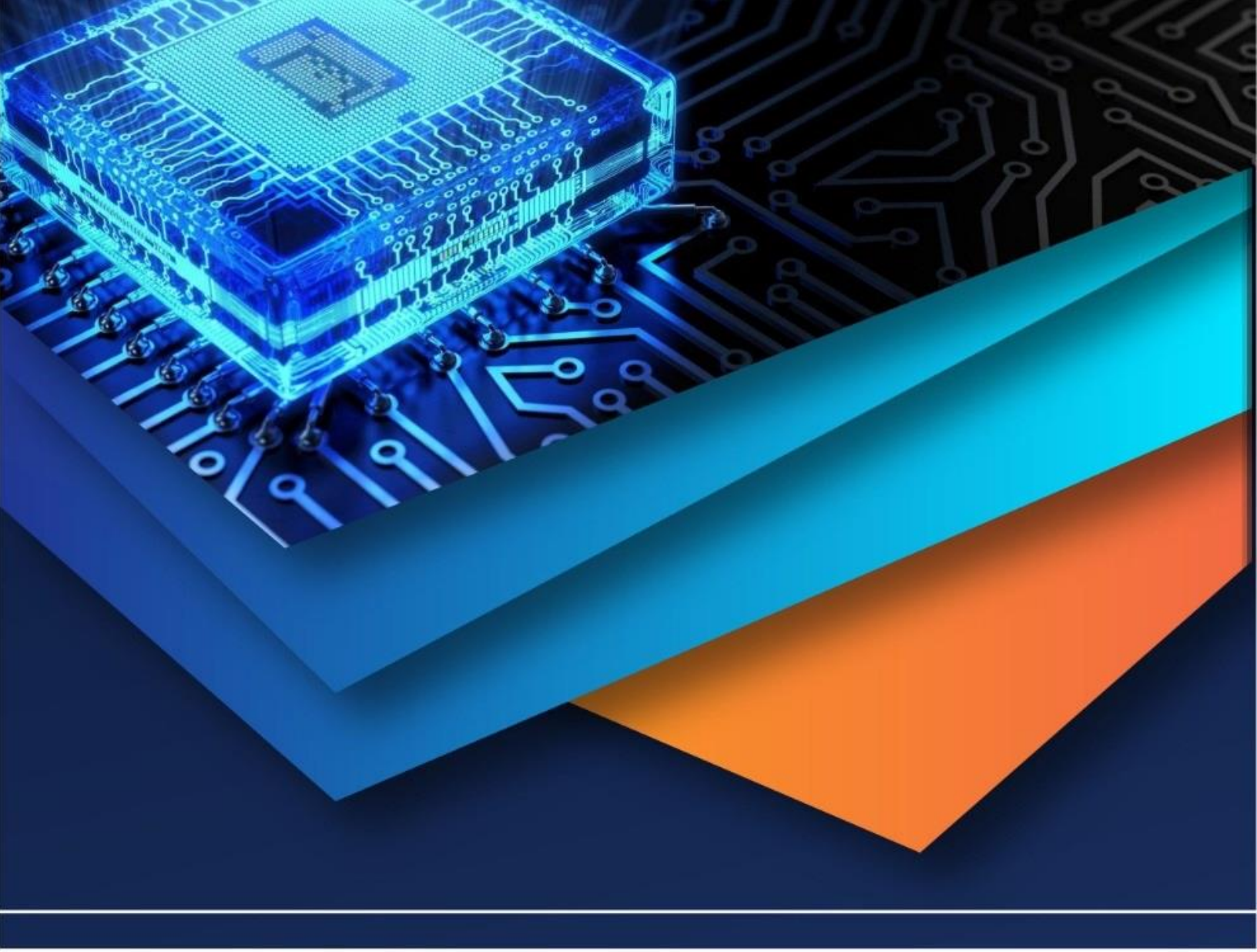

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