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A Review Paper on the Analysis of Beam Column Joint using ANSYS

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Abstract: ***In multistorey building, the beam column joint is one of the foremost crucial regions. Normally, it is the observe that the joint is rigid frame. After study the various researcher paper the joint is not rigid. During the earthquake failure occur in the beam and column as well as in joint, therefore the joint is important to consider. The joint must be well built adequate to resist and sustain the lateral load in the event of earthquake. The failure part on the structure is joint. In this paper shows a review of the behaviour of joint with different type specimen lateral reinforcement and discuss about the ANSYS software design the interior, exterior, and inner beam column joint is design by changing reinforcement pattern with the cyclic loading for strengthen.***

Keywords: Beam column joint, ANSYS, shear force, cyclic load, longitudinal reinforcement.

I. INTRODUCTION

The beam column joints are most precious region in the structure and it concentrated on toughness and sufficient harborage within the joint. The joint proves to be ineffectual although subservient to huge lateral load. By increment of numeral of loops at the joint the joint sturdiness can be enlarged. In Indian practice, the joint is ignored for particular design. This may be design when the building in earthquake zone. During the earthquake the most affected part in building is beam column joint. In the joint the crack is developed and failure may occur. In the joint axial compression and transverse bending is produce. It is complicated and challenging task for structural engineer to design the beam column joint. The noteworthy part of structural design is anchorage strength of development length reinforcing bars in the joint. At the present headed bar is significantly used as longitudinal and transverse reinforcement to strengthen the concrete structure to increasing the load capacity. Therefore, it is important to design the beam column joint. By changing the reinforcement pattern in joint or by proper design of joint using software it may be useful.

II. BEAM-COLUMN JOINT

Various study shows that interior and exterior beam column joint is used. In [1] In the proper design guidelines of ACI and AIJ code the new model is enlarged for appraise the toughness of reinforcement of beam column joint. They compare the joint shear strength of previous model and after modification as per code. In new model parallel influence are examine in parallel section clasp of successful zone. Whirlwind nearly corresponding to parallel influence separately academy ratio of beam column joint. Interior beam column joint is used to transverse reinforcement and shear strength and in column the axial forces are act, for this parameter the new model is estimate with this help of parameter. In study [2-6] In this paper T-shaped longitudinal reinforcement in column harbours is used beam column joint for impulsive collapse could be originated at anchorage. Exterior beam column adding the ferrocement in beam column it reduces the axial load and steel ratio in beam on ultimate load of model.[4] The ferrocement is used for strengthen the building in which the exterior beam column joint is selected. Comparison of experimental result with analytical result on ANSYS. The experimentally test was setup and the to avoid the brittle shear failure of joint transverse reinforcement is used with reference BCJ design. However, it shows that the seismic analysis of the links, encompass hardiness and firmness abasement. It is concluded that the modelling of exterior joint reduces the rigid joint can shows to consequence which is unsafe design. [3] this is experimentally based paper in which six 1/3rd scaled different specimen is used with cyclic and reverse cyclic loading. C, C1, C2, HC, HC1, and HC2 specimen is used. In C is design as per IS 456, the specimen C1 additional tie bar, in specimen C2 additional stirrups is used, HC is design as per IS 456, HC1 is additional tie bar and HC2 is additional stirrups is used. The headed bar is additional steel plate is used with straight bar. In specimen cyclic and reverse cyclic load is used, in specimen maximum load is offered after loading is 11.84KN,12.22KN, 11.93KN, 12.01KN,13.03KN,12.58KN. After application of specimen in longitudinal reinforcement the headed bar having less deformation than the other specimen. The specimen C has large displacement, less shear capacity other than the specimen. Using the headed bar, the shear capacity will increase, crack formation is less and bearing capacity more. The energy dissipation of specimen is 11.41%, 4.96%, 8.74%,19.36% and 13.35% more than control specimen. From the result it is conclude that the horizontal tie bar is better than vertical stirrups.

III. MECHANISM OF FORCES

Study shows that mainly cyclic, monotonic, reversed cyclic loading used in [7-11] the cyclic load means the extended and reduplicate applied load such as oscillate stress, strain, strength, pressure etc. equipment or a construction element causality degeneration of the material and eventually leads to exhaustion. In the et.al Elsayed[7] to confirmation the finite element model they compare the two types of modelling monotonic and cyclic. They improve the defect of finite element; defects are long time used of analysis. Even as junction point, exterior- exterior component rather than of node-to-node component to increase the design. In the reverse cyclic loading one time rotation as regards the indicated which kind of loading system happen at the time that a ductile pressure of imperceptible Useful is pragmatic to an unburden wedge along with later let out, next a compacting pressure about the alike valuation is try to apply and liberate.[8] exterior beam column joint is design with British standard BS 8110 with non-seismic were carried out. Study shows that non-seismic design improves successful the earthquake and enhance the shear strength of joint in horizontal stirrups which were provided in beam column joint. Monotonic load is the single unvarying load. A parametric study shows that they use the material concrete damaged plasticity (CDP), at which is an accommodation of the Drucker-Prager power of postulation, durability, axially loaded column, joint stirrups. They use L-shaped and U-shaped reinforcement bar. By comparison of ANSYS and ABAQUS software the ABAQUS is gives more realistic finings.

IV. REINFORCEMENT PATTERN

Study shows [11] by replacement of transverse reinforcement the cross-king steel is used to strengthen the toughness, pliability and firmness of the structure. In this paper [12] studied that the improving the seismic performance by adding the cross inclined bar (novel reinforcement) pattern in exterior beam-column joints. They first design the G+3 building in staad pro software future FEM is design in ANSYS. Cross inclined bar is used to cyclic load to increase the shear capacity of beam column joint. Aspect ratio (h_b/h_c) should be greater in joint there will be less contribution of the cross-incline bar of joint. It shows that high durability, failure after come out the maximum capability.

V. STRUCTURAL MODELLING

Various study [13-16], for design the model mostly used ANSYS and ABAQUS software. The all- pertinent details of component and node details which is not available in experiment test, like contact or friction forces in discretization of FM model. Using the experimental data prefer the literature paper. After modelling the stress and deformation is known. et.al.[14] the author is used non-linear type of matter together with commutative, abridged junction, re-contact and slide. Shear failure are mix into beam bending non-success, damage the core share failure the damage specimen is change by using carbon fibre reinforcement and plasticity of joint have small crash succeeding augmentation. After crack in joint reinforcement the result of the finite element is more significant it improves the destruction state of specimen beam bending failure and core shear failure may occur. By using the software is more significance to design the joint which is not done by experiment.

VI. CONCLUSION

The conclusion from the above studies is:

A. Discuss the behaviour of type of joint in reinforced concrete. Forces acting on joint such as cyclic, monotonic, reverse cyclic forces and their effect on joint is study.

B. Explained the parameter of shear strength and shear demand of joint. The factors affecting the axial load and the number of transverse reinforcements in the joints.it also discussed the detailing and design of shear reinforcement of joint. Can be developed the significant amount of ductility in beam column joint of structure.

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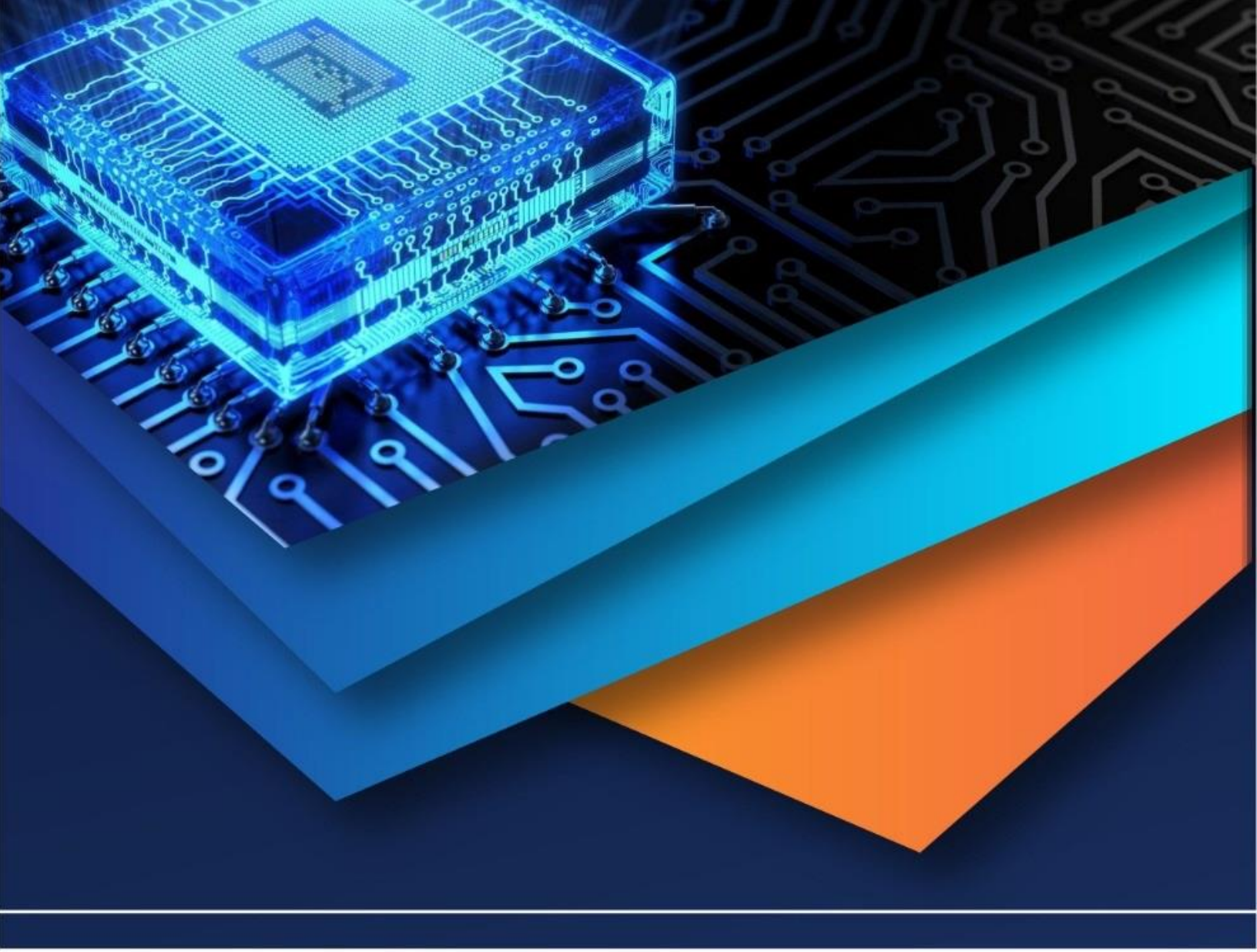

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