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A Review: Automated Excel Sheets for Various RC Elements

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***Abstract:** In this paper, EXCEL spreadsheet software is used in analyzing and calculating rebars of different RC elements like beams, columns and slabs. Five different types of EXCEL spreadsheet like simply supported beam, cantilever beam, short column and long column, one way and two way slab has been calculated in this project work. Different characteristics conditions like effective span, nominal cover, effective length of compression members is applied in our study. Apart from the inclusion of various characteristics properties, different checks have been assigned to the RC elements. Reference has been taken from RCC code IS 456:2000*

***Keywords:** MS Excel, IS 456:2000, Analysis, Design, Beam, Column, Slab.*

I. INTRODUCTION

This study shows that, with the help of MICROSOFT excel we can create a program or a software which can calculated reinforcement bars and distribution bars only by given dimensions and assigning properties of the reinforced elements. For the study, a huge amount of documented data is required. It will be recorded by going through different papers and extracting the values from the same. Pilot study is carried in order to evaluate reliability, feasibility and validation of data collected. Analysis and design will extensively employ MS EXCEL environment.

II. CODING

Microsoft Excel is a spreadsheet developed for Windows, Android and IOS. It features calculation, tabular forms, pivot tables. It is a very widely applied spreadsheet for these type of functions, especially since 1993.
There are three activities must be performed to achieve that goal.

A. Coding of the RC elements using MICROSOFT EXCEL..
B. The calculations to decide the explanatory.
C. Result is checked in the OUTPUT.

III. PAST RESEARCH

1) *Santosh kumar P.T.(2014)*[(1)] developed a simple method using MS-EXCEL sheets, from the existing Indian codal procedures. Results are compared with existing literature and completion of work graphs shoe that results are matching with the existing literature. Hence, these EXCEL SHEETS can be used in conjunction with the analytical soft wares like STAAD and ETABS for the design of columns
2) *Varsha S Danavandi (2017)*[(2)] analyzed for the design of foundation and it's types, slabs and it's types, columns, beams and it's types, staircase. Developed a computerized programme to reduce the paper work and safe of time in management which increases the effeciency and decreasing the work load. The focus is on concepts related to construction management and structural engineering ranging from a simple cost estimating problem, structural design analysis to advanced applications.
3) *Mahesh Kumar(2012)*[(3)] used simple spreadsheet programmed like MS EXCEL helps in evolving efficient and quick designs of buildings and other structures on various projects. While standard software like STAADPRO were used in the frame analysis but self created excel sheets for design of foundation, beams and slabs etc.
4) *Suryam Tiwari(2018)*[(4)] used simple spreadsheet programmed like MS EXCEL helps in evolving efficient and quick designs of buildings and other structures on various projects. While standard software like STAADPRO were used in the frame analysis but self created excel sheets for design of foundation, beams and slabs etc. The primary point of this undertaking is to setup a Microsoft EXCEL spreadsheets using VBA programme.

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5) *Ima Rahmanian(2014)*[5] presents spreadsheets implementation of cost optimization of RC beams in the MS EXCEL to illustrate the efficiency of the exhaustive methods for such small search spaces. Further more, a sensitivity analysis is performed on the contribution of various design parameters to the variability of the overall cost of RC beams. The review of literature suggests that nonlinear deterministic approaches can be effeciently employed to provide optimal design of RC beams, given the small number of variables.
6) *Fernandes R. J(2017)*[6] developed a VBA program to access the analysis results from STAAD Pro to MS Excel such that the design process is fully automated which reduces manual interference. A spreadsheet has been developed for the design of Selective Catalytic Reduction Pile Cap Foundation, The micro piles were modeled in STAAD Pro v8i and the forces extracted to an Excel spreadsheet through OpenSTAAD VBA macro.
7) *Richard Lawrenve Emberley(2013)*[7] created a numerical model in microsoft excel to effectively study column performance with differing loading, aggregate and dimensional characteristics under varying time- temperature curves and fire exposures. The spreadsheet model allowed for complete transparency of the calculations and provided a means to visualize the data in flexible ways. ANSYS and several published column furnace tests were used to benchmark the heat transfer and structural analysis portions of the model.
8) *Poonam Gare(2016)*[8] developed a programme in advance excel that can be used not only for the analysis and design of the buildings but also to estimate the optimum design of a building components such as beam, column. The present dissertation provides the comparison between two optimization methods is done, after comparing both method most feasible method is selected and then with using that method structural elements are designed with optimization approach.

IV. PROBLEM FORMULATION

The various problems in different softwares like STAADPRO, ETABS is that they are not user friendly and require a lots of input data to process the analysis where as EXCEL sheets are very user friendly. Instead of making two sheets for calculation of rebars of one way and two way slabs, single sheet is made for the the slabs using conditional properties of excel.
In this paper we have formulated a user friendly excel spreadsheet for the calculation of rebars of a simply supported beam in which less number of input values are required for the desired output.

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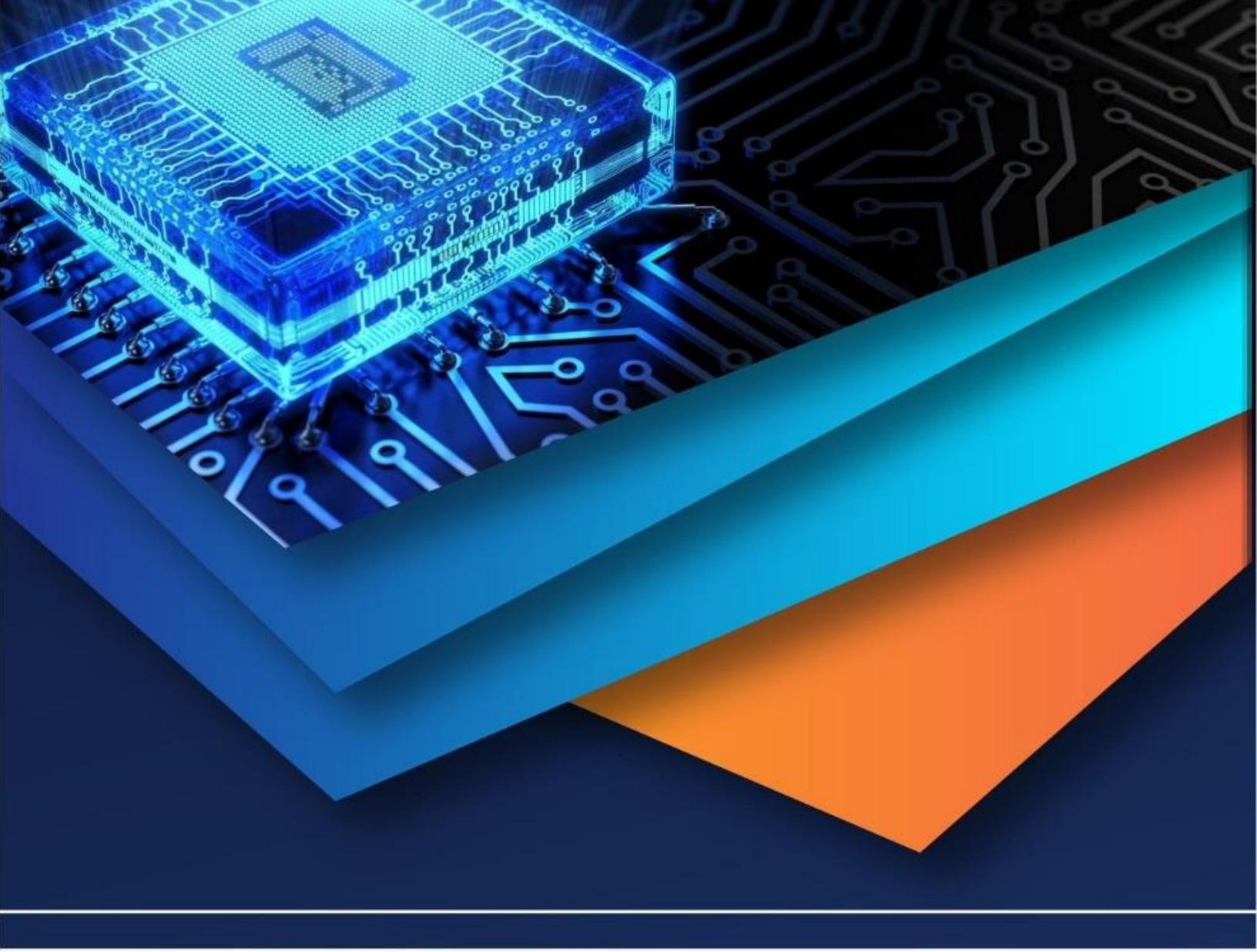

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