Review paper on design and analysis of multi-storey building by the use of Stadd.Pro

Falak Vats
falak5vats@gmail.com
Rajasthan Technical University, Kota, Rajasthan

ABSTRACT

Structural designing requires a detailed structural analysis on which the design of the structure is based. But it is not always possible to do in manual calculation hence the need for programming tools was found. For which several of power tools were formed, among which the most widely used one is Stadd.Pro, which allows the structural and seismic analysis prior to its construction. For high rise buildings its quite feasible to use Stadd.Pro for computing the loads and its combination and analysing the structure and designing the structure based on the analysis.

Keywords— *Structural designing, Analysis, Seismic, Stadd.Pro, Programming tools*

1. INTRODUCTION

Infrastructure is the basic way to represent the level of development of a country, among which the major share is shared by the high raise buildings which are not possible without a structural designer. As the world is transforming the high rise buildings are in a great demand which is to be fulfilled without sacrificing any of the three factors, cost, time and safety. Achieving this is not possible with manual calculation hence to counter this we need highly advanced ways of computation, which can allow you to calculate and analyse the structural variables like shear force, nodal displacement, bending moment etc. The answer to such problems is Stadd.Pro which provides a much faster approach to structural analysis and designing with chances of minimum errors. There has been several research conducted comparing the results from Stadd.Pro to the manually calculated results, which all support the use of Stadd.Pro over manual the one. Stadd.Pro is a much better way to analyse the complicated load combinations and is quite versatile.

2. LITERATURE REVIEW

B. Gireesh [1] Studied the structural and seismic analysis of G+7 structure using the Stadd.Pro software. In this study the design was based on the following Indian standard codes: IS 1893 (Part 1) – 2007, for the design of base shear. IS 1893:2002 for the earthquake resistant criteria which stated the different analysis criteria based on Zone of area, the height of building and Importance of the building. After starting the project various dead load, live load, wind load, snow load and earthquake load was imposed for which the analysis will run. The building was designed for Heydrabad area whose zone was II. From the analysis, it was concluded that the steel quantity was increased by 1.517% compared to the conventional concrete design. The earthquake load was more dominant than wind load in the selected area but still, there was no need for a shear wall and braced column as the base drift at every storey is 0.0 hence the structure was safe under the drift condition.

Aman et.al [2] The analysis and design of C+G+5 residential cum commercial building based on the criteria defined by the IS codes on Stadd.Pro software. The load imposed were only dead and live load hence the load combination generated was 1.5(D.L. + L.L.) after which the analysis of the building was done for the Frame and the resulting Bending moments and shear forces were studied. The detail of all the building members was represented along with the functions of slab, beam, column, footing and staircase. From which it was concluded that the horizontal deflections were within 20mm and the structure was safe and economical. And not much difference was obtained between the results from Kani's method and Stadd.Pro

Mahesh et.al [3] This study was focused on the analysis of the structure in the effect of wind load on the sloping ground by the software Stadd.Pro. The design of wind was based on the Indian standard code IS 875 part- III. The study stated that as the height increases the Bending moment, shear force and joint displacement all show an approx directly proportional relationship with the height. Hence it was concluded that the zone IV was the most critical one as the values of bending moment, shear force and joint displacement was highest in the IV zone and was least in the Zone I.

Anoop et.al [4] A project to design a G+5 floor structure at Kalakode, 4km from Paravoor. The planning of the building was done using the software Revit 2011 with the help of AutoCAD 2014, and the structural analysis was done in Stadd.Pro.V8i The project considered the load cases on basis of the Indian standard codes IS1893:2002 for seismic load, IS 875 Part 3 for wind loads, IS 875 Part 1 for dead loads and Part 2 for live loads. The combinations of these loads were generated on the basis of IS 875 Part 5. And the design was done on the basis of IS 456:2000. After analysis, it was concluded that the graphical input generation provided by Stadd. Pro allows the generation of a graphical model of the structure.

D. R. Deshmukh et.al [5] Analysis and design of G+19 Story building using Stadd.Pro The design was based on Indian Standards on Stadd. Pro and was then compared with respect to the one, made from the manual calculation. The design loads considered were dead load, live load, seismic load and wind load and were calculated on the basis of Indian Standards. It was seen that the load was maximum when applied in the x-direction (parallel to shorter span) and the deflection increases as the height of building increases. The data regarding take off for material was provided. The results obtained for base shear was 5% more in the case of Stadd.Pro as compared to manually. It was concluded in the study that Stadd.Pro is versatile software which can be used to analyse a building and compute reinforcement.

3. CONCLUSION
- Stadd.Pro gives hardly any variation in results compared to the results computed manually.
- Stadd.Pro allows you to follow the criteria of several design codes for eg. The Indian standards relating to loads, designs, analysis etc.
- Stadd.Pro is a much easier and faster way of analysing and designing a structure when compared to manual computation.
- The variation of seismic load, wind load, shear force and bending moment with the height is showing a direct relationship.
- Stadd.Pro is a user-friendly way to analyse the structure as its GUI is very easy to work with and the software is quite versatile.

4. REFERENCES
[1] B. Gireesh Babu, "Seismic Analysis and Design of G+7 Residential Building Using STAADPRO", International Journal Of Advanced Research, Ideas And Innovations In Technology, Pg. 924-930, Volume3, Issue3, -2017.
[2] Aman, Manjunath Nalwadgi, Vishal T, Gajendra, "Analysis and design of the multistorey building by using STAAD Pro", International Research Journal of Engineering and Technology (IRJET), Pg. 887-891, Volume: 03 Issue: 06, June-2016.
[3] Mahesh Ram Patel, R.C. Singh, "Analysis of a Tall Structure using Staad Pro providing different Wind Intensities as per 875 Part-III", International Journal of Engineering Sciences & Research Technology, Pg. 2018-2025, May, 2017.
[4] Anoop. A Fousiya Hussian, Neeraja.R, Rahul Chandran, Shabina.S, Varsha.S, "Planning Analysis and Design of Multi Storied Building by Staad.Pro.v8i", International Journal of Scientific & Engineering Research, Volume 7, Issue 4, April-2016.
[5] D.R. Deshmukh, A.K. Yadav, S. N Supekar, A. B. Thakur, H. P Sonawane, I. M. Jain, "Analysis and Design of G+19 Storied Building Using Staad-Pro", Pg. 17-19, ISSN: 2248-9622, Vol. 6, Issue 7, (Part-1) July 2016.