- The natural time period of the boiler structure is reduced by 21% using CFST columns compared with steel plus-I columns.
- The base shear of the boiler structure got increased by 35% and 31% along X-axis and Z-axis by replacing steel plus-I columns with CFST columns.
- The structure with CFST columns shows a reduction in storey drift up to 40% compared to that of Plus-I columns.
- Structural steel weight reduction of 905MT is achieved by replacing plus-I columns with CFST columns. But, there is an addition of 1351.69 Cubic meter of M30 concrete that is used in CFST columns.
- In the cost estimation of boiler columns, erection cost is not included. As compared to steel plus-I columns there is a net saving of 62.70 million (INR) is noticed when CFST columns are employed for the structure considered.
- Present work shows that the use of CFST columns in boiler structures provides considerable cost saving in addition to its better structural performance.

References

[1] Bridge, R. Q. (1976). "Concrete filled steel tubular columns." School of Civil Engineering, The University of Sydney, Sydney, Australia, Research Report No.R283.
[2] Matsui, C., Tsuda, K. and Ishibashi, Y. (1995). "Slender concrete filled steel tubularcolumns under combined compression and bending." Proceedings of the 4th Pacific Structural Steel Conference, Singapore, Pergamon, 3(10), 29-36.
[3] Chung, J., Tsuda, K. and Matsui, C. (1999). "High-strength concrete filled square tube columns subjected to axial loading." The Seventh East Asia-Pacific Conference on Structural Engineering & Construction, Kochi, Japan, 2, 955-960.
[4] Mursi, M. and Uy, B. (2006a). "Behaviour and design of fabricated high strength steel columns subjected to biaxial bending part I: Experiments." Advanced Steel Construction, 2(4), 286-313.
[5] "Nonlinear analysis of axially loaded concrete-filled tube columns with confinement effect", Hsuan-The Hu, Chiung-Shiann Huang, Ming-Hsien Wu, and Yih-Min Wu, J.Struct.Eng, Volume 129, Issue 10, October 2003, Pages 1287-1430.
[6] Ehab Ellobody, Ben Young, Dennis Lam (2006) : "Behaviour of normal and high strength concrete filled compact steel tube circular stub columns." Journal of constructional steel research- J CONSTR STEEL RES, Vol.62, no.7, PP.706-715, 2006.
[7] L.Guo, Sumai Zhang, Wha-Jung Kim, Gianluca Ranzi (2007)- "Behaviour of square hollow steel tubes and steel tibes filled with concrete." – ELSEVIER Journal, Thin-walled structures 45 (2007), PP. 961-973.
[8] Liang, Qing Quan (2009) Strength and ductility of high strength concrete-filled steel tubular beam-columns. Journal of Constructional Steel Research, 65 (3). pp. 687-698. ISSN 0143-974X
[9] Code and Commentary on Eurocode 4, 2004, "Design of composite steel and concrete structures - Part 1-1: General rules and rules for buildings".
[10] IS 800-2007, Code of practice for general construction in steel, Bureau of Indian Standard, New Delhi.
[11] IS 875(1987-Part 1), - code of practice for design loads(other than earthquake)for buildings and structures ,Dead loads, Bureau of Indian standards (BIS), New Delhi.
[12] IS 875(1987-Part2), - code of practice for live loads, Bureau of Indian Standards (BIS), New Delhi.
[13] IS 875(1987-Part3), - code of practice for wind loads, Bureau of Indian Standards (BIS), New Delhi.
[14] IS 875(1987-Part5), - code of practice for special loads and combinations, Bureau of Indian Standards (BIS), New Delhi.
[15] IS 1893 (part 1 and part 4)-2002, Criteria for earthquake resistant design of structures, Bureau of Indian Standards (BIS), New Delhi.