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TITLE OF PROJECT:

A Proposed Novel Approach of Tonnages Reduction OTT Structure for Conventional and Composite Materials by FEA Analysis and CFD Approach.

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ABSTRACT:

With advent of the highspeed digital computers and wide gamut of FEA Software, it is possible to carry out the detailed analysis. Structural analysis can be estimated with focused accuracy in domains viz., stress, deflection, frequency, thermal distortion and earthquake analysis point of view.

In advanced operating systems, number crunching for input/output(I/O) bound jobs, the possibility of inverting large size stiffness matrices with more number of nodes and FEA elements have seen light of the day. Volcanic proliferation of analysis techniques have mushroomed across the globe using advanced mesh and mesh free approaches.

Along with FEA techniques, contemporary software viz., Ansys, Abaqus, Solid works, Hyper works, Ideas and Comsol, Coventer software give an opportunity to further carry out parallel analysis in master data base sharing concept and with bi-directional associativity. Particularly, for space lattices it can be taken up by conventional approach and also by modelling wind envelope for Drag, Lift and Moment for further optimization by sensitivity methods.

This approach gives reduction in steel tonnage requirements. In this research work, sensitivity-based analysis has been carried out using FEA and CFD approaches for an OTT structure with an objective to accurately model the wind envelope to estimate the coefficients of drag, lift and moment to reduce the overall weight of structure.

Along with detailed analysis an additional sensitivity-based approach for weight reduction has been carried for two different materials that is 1) conventional steel 2) and steel replaced by Glass Fiber Reinforced Plastic (GFRP) which has been developed by ATIRA Ahmedabad.

The *modus-operandi*, in this procedure is to swap the density (**ρ**) and modulus of elasticity E, of mild steel with that of GFRP. However, techno-commercial studies have been carried out from the cost saving point of view keeping in mind the fabrication cost of both the materials.

KEYWORDS: CFD (Computational fluid dynamics) Analysis, OTT (Overhead transmission tower) structure, FEA (Finite Element Analysis), Sensitivity-based, Steel reduction

CATEGORY: Structural Engineering