

## Multi-Disciplinary Optimisation Methodology for Aircraft Load Prediction

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**Abstract :** The paper demonstrates a methodology that can be used at an early design stage of any conventional aircraft. This research activity assesses the feasibility derivation of methodology for aircraft loads estimation during the various phases of design for a transport category aircraft by utilizing potential of using commercial finite element analysis software, which may drive significant time saving. Early Design phase have limited data and quick changing configuration results in handling of large number of load cases. It is useful to idealize the aircraft as a connection of beams, which can be very accurately modelled using finite element analysis (beam elements). This research explores the correct approach towards idealizing an aircraft using beam elements. FEM Techniques like inertia relief were studied for implementation during course of work. The correct boundary condition technique envisaged for generation of shear force, bending moment and torque diagrams for the aircraft. The possible applications of this approach are the aircraft design process, which have been investigated.

**Keywords :** multi-disciplinary optimization, aircraft load, finite element analysis, stick model

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