AN INTEGRATED DESIGN APPROACH FOR COMPOSITE STRUCTURES

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ABSTRACT

The advanced composite structures like Graphite/Epoxy are being adopted by the aerospace industry for decades. The technologies for developing of these structures, design, analysis, manufacturing, etc, were also being mature and steady. Because of the inherit complexity of these structures, the development technologies were separated into various disciplines. The different languages between disciplines will cause not only the communication problems but the schedule problems too. This thesis introduces an integrated concept; to integrate finite element analysis as the tool of structural analysis and life cycle cost analysis as the tool of manufacturing process analysis into a simple design environment. To help design engineer make decisions in the preliminary design phase without consulting relative personals. To achieve the purpose of concurrent engineering by shorten the development schedule. In the manufacturing process analysis, this thesis compare two different processes for advanced composite structures that commonly used, thermo-setting and thermo-plastic, by there life cycle cost. The life cycle cost analysis includes design, analysis, production, maintenance, and salvage costs, etc. Though the decision analysis, plus a structural applicability weighting factor, the design engineer can choose the lower life cycle cost manufacturing process, which can still meet the design requirements.

Keywords : Advanced Composite Material ; Life-cycle Cost ; Decision Analysis

Table of Contents

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