

Application of Composites Shafts in Aero-engines

Problem Definition

Composite materials have transformed aerospace design by offering high strength-to-weight ratios, stiffness, and improved fatigue resistance compared to conventional alloys. However, jet engine shafts remain predominantly metallic due to their demanding operating environment: high rotational speeds, significant torsional loads, and exposure to elevated temperatures and potential fire zones. The feasibility of composite shafts in jet engines requires a systematic exploration of existing solutions, current barriers, and certification requirements. The candidate will conduct a literature review to investigate how composites have been applied in similar aerospace components, identify the technical and regulatory challenges specific to engine shafts, and examine safety standards such as fireproofing criteria. The study should also consider the motivation for pursuing composites in this context, including weight savings, system efficiency, and potential integration with smart sensing or monitoring, outlining possible pathways toward overcoming identified challenges. The deliverables will be a written report and a final presentation highlighting the key findings.