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**A Study of Improving DFM for Non-Metallic Embedded Parts Using  
SR Prototyping**

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**ABSTRACT**

Improving Design for Manufacturing (DFM) for non-metallic embedded parts using SR prototyping offers an effective approach to overcoming common manufacturing challenges associated with complex geometries and material limitations. Non-metallic embedded components are widely used in automotive, aerospace, electronics, and medical industries due to their lightweight properties, corrosion resistance, and design flexibility. However, traditional manufacturing processes often face issues such as dimensional inaccuracies, weak interfacial bonding, shrinkage, and assembly misalignment. SR (Stereolithography Resin) prototyping, a form of additive manufacturing, enables precise fabrication of intricate designs with high surface quality and fine resolution. By integrating SR prototyping during the early design phase, engineers can validate geometry, tolerance, and structural compatibility before mass production. This iterative prototyping process helps identify design flaws, optimize wall thickness, improve embedding alignment, and enhance bonding strength between materials. Additionally, simulation-driven design modifications combined with rapid prototyping reduce material waste and development time. The use of SR prototyping also supports better visualization and functional testing, ensuring manufacturability and product reliability.