

## **Preliminary Conceptions of 3D Prototyping Model to Experimental Investigation in Hypersonic Shock Tunnels**

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**Abstract :** Currently, the use of 3D rapid prototyping, also known as 3D printing, has been investigated by some universities around the world as an innovative technique, fast, flexible and cheap for a direct plastic models manufacturing that are lighter and with complex geometries to be tested for hypersonic shock tunnel. Initially, the purpose is integrated prototyped parts with metal models that actually are manufactured through of the conventional machining and hereafter replace them with completely prototyped models. The mechanical design models to be tested in hypersonic shock tunnel are based on conventional manufacturing processes, therefore are limited forms and standard geometries. The use of 3D rapid prototyping offers a range of options that enables geometries innovation and ways to be used for the design new models. The conception and project of a prototyped model for hypersonic shock tunnel should be rethought and adapted when comparing the conventional manufacturing processes, in order to fully exploit the creativity and flexibility that are allowed by the 3D prototyping process. The objective of this paper is to compare the conception and project of a 3D rapid prototyping model and a conventional machining model, while showing the advantages and disadvantages of each process and the benefits that 3D prototyping can bring to the manufacture of models to be tested in hypersonic shock tunnel.

**Keywords :** 3D printing, 3D prototyping, experimental research, hypersonic shock tunnel

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