

## Evaluation of Mechanical Behavior of Laser Cladding in Various Tilting Pad Bearing Materials

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**Abstract :** The tilting pad bearing is a kind of the fluid film bearing and it can contribute to the high speed and the high load performance compared to other bearings including the rolling element bearing. Furthermore, the tilting bearing has many advantages such as high stability at high-speed performance, long life, high damping, high impact resistance and low noise. Therefore, it mostly used in mid to large size turbomachines, despite the high price disadvantage. Recently, manufacture and process employing laser techniques advancing at a fast-growing rate in mechanical industry, the dissimilar metal weld process employing laser techniques is actively studied. Moreover, also, Industry fields try to apply for welding the white metal and the back metal using laser cladding method for high durability. Furthermore, it has followed that laser cladding method has a lot better bond strength, toughness, anti-abrasion and environment-friendly than centrifugal casting method through preceding research. Therefore, the laser cladding method has a lot better quality, cost reduction, eco-friendliness and permanence of technology than the centrifugal casting method or the gravity casting method. In this study, we compare the mechanical properties of different bearing materials by evaluating the behavior of laser cladding layer with various materials (i.e. SS400, SCM440, S20C) under the same parameters. Furthermore, we analyze the porosity of various tilting pad bearing materials which white metal treated on samples. SEM, EDS analysis and hardness tests of three materials are shown to understand the mechanical properties and tribological behavior. W/D ratio, surface roughness results with various materials are performed in this study.

**Keywords :** laser cladding, tilting pad bearing, white metal, mechanical properties

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