

Design Optimization of Air Intake System (AIS) of 1.6L Engine by Adding Guide Vane

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ABSTRACT

Air intake system and filter play major role in getting good quality air into automobile engine. It improves the combustion efficiency and also reduces air pollution. This paper focuses on optimizing the geometry of an intake system in automobile industry to reduce the pressure drop and enhance the filter utilization area by adding guide vane. 3D viscous Computational Fluid Dynamics (CFD) analysis was carried out

for an existing model to understand the flow behavior through the intake system, air filter geometry and ducting. Results obtained from CFD analysis of the existing model showed good improvement. Based on existing model CFD results, geometrical changes like guide vane placement in inlet plenum of the filter, optimization of mesh size, removal of contraction in clean pipe of intake system etc are carried out, to improve the flow characteristics. The CFD analysis of the optimized model was again carried out and the results showed good improvement in flow behavior. By using 3D CFD analysis, optimal design of the intake system for an automobile engine is achieved with considerable reduction in development time and cost.

KEYWORDS: Air intake system, CFD, optimization, Automobile Engine.