Simulation of a COMPREX® Supercharger in Transient Operations

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ABSTRACT

This paper deals with the GT-Power 1-D simulation of the pressure wave supercharger (PWS), also known as the COMPREX® device, in transient operations both for SI and diesel engines. The behavior of the COMPREX® supercharged engine is shown in direct comparison with the turbocharged one. For this comparison the transient responses at constant engine speeds and drive-away tests were investigated. The COMPREX® 1-D model, which shows good agreement with the simple model based on the theory of adiabatic shock wave and the linear gas dynamics principles, and whose physical behavior is representative enough, has not yet been compared to measurements. Some specific COMPREX® supercharger properties affecting its proper function are mentioned as well.

KEYWORDS

Pressure wave supercharger
1-D Model
Full load behavior
SI engine
Diesel engine
Internal exhausts gas recirculation
Transient response
Acceleration test