

The Application of Virtual Engine in a PSA 1.4l SI Engine

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ABSTRACT

Nowadays, due to the high competitiveness in the automotive market, the car manufacturers and the engine developers are concentrating as many efforts as possible in order to diminish the lead-time to production and to promote cost reductions of their engine developments.

As a consequence, numerical simulations, allowing a significant reduction in the amount of engine and bench tests, are substituting many systems and component tests. The integration of individual numerical simulation tools generates the philosophy of Virtual Engine Development, which is based on the concept of simulating as much as possible the entire engine as well as its components behaviours.

This paper presents the application of Virtual Engine Development (VED) in a PSA 1.4l SI engine development. Theoretical results of engine performance as well as powercell components behaviour such as piston, rings, conrod, bearings, liner, engine block and cylinder head, among others, are presented and discussed. Those simulations allowed a better knowledge of the entire engine system as well as the anticipation and solution of potential problems.

To sum up, some numerical and experimental results comparisons are presented. Furthermore, a discussion over the achieved lead-time and cost reductions allowed by the application of Virtual Engine in this engine development is also presented.