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[Home](#) > Effect of Intake Channel Design to Cylinder Charge and Initial Swirl

Effect of Intake Channel Design to Cylinder Charge and Initial Swirl

Two different medium-speed diesel engine cylinder head designs have been studied. The focus of the study has been the effect of intake channel design in the in-cylinder flow. The study has been carried out by CFD. The first cylinder head is a standard Wärtsilä 20 cylinder head and the second one is a specially designed head for a single cylinder research engine, called Extreme Value Engine (EVE). The CFD boundary conditions have been simulated by the help of a 1-d simulation code. In the full load cases the maximum cylinder pressure was 300 bar. Simulations have been done at lower load level too. One simulation with the new cylinder head was carried out with one intake valve closed in order to get an idea of the swirl to be generated by this approach. In the study the in-cylinder flow field, the cylinder charge and turbulence kinetic energy have been examine.

Author Name:

Eero Antila

Ossi Kaario

Matteo Imperato

Martti Larmi

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[2] <http://www.cd-adapco.com/industries/ground-transportation-sub-industry>

[3] <http://www.cd-adapco.com/industries/ground-transportation/%E6%B1%BD%E8%BD%A6>