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Radial Fuel Injection Computational Fluid Dynamics Model for a Compression Ignition Two-Stroke Opposed Piston Engine

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Abstract : Designing a new engine requires a large number of different cases to be considered. Especially different injector parameters and combustion chamber geometries. This is essential when developing an engine with unconventional build – compression ignition, two-stroke operating with direct side injection. Computational Fluid Dynamics modelling allows to test those different conditions and seek for the best conditions with correct combustion. This research presents the combustion results for different injector and combustion chamber cases. The shape of combustion chamber is different than for conventional engines as it requires side injection. This completely changes the optimal shape for the given condition compared to standard automotive heart shaped combustion chamber. Because the injection is not symmetrical there is a strong influence of cylinder swirl and piston motion on the injected fuel stream. The results present the fuel injection phenomena allowing to predict the right injection parameters for a maximum combustion efficiency and minimum piston heat loads. Acknowledgement: This work has been realized in the cooperation with The Construction Office of WSK "PZL-KALISZ" S.A." and is part of Grant Agreement No. POIR.01.02.00-00-0002/15 financed by the Polish National Centre for Research and Development.

Keywords : CFD, combustion, injection, opposed piston

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