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INTERDISCIPLINARY CONTENTS OF THE PROJECT “THE MINIMUM FUEL CONSUMPTION CAR”

ABSTRACT: The project “The minimum fuel consumption car” is a global target in car development. This global target can be taken as a symbol for the quest towards minimum fuel consumption and emission for all vehicle categories. Initial thinking suggests that a reduction in size and weight alone would not be sufficient to achieve the target economy of the minimum fuel consumption. Other technical measures need to be taken if the requirements for comfort, driving performance and safety are to be fulfilled. These include optimisation of the driving unit, (the driveline engines and gears) as well both fuels and lubricants. The trends of the automotive engines development, shown in this paper, are covering our views and options through all aspects of the leading automotive technologies.

KEYWORDS: compression ratio, downsizing, fuel consumption, fuels, IC engine

INTRODUCTION

Universal fulfilment of nature laws requires more sophisticated approaches to vehicle design, because the vehicles are the biggest consumers of energy, oxygen and raw materials. Their further use is therefore conditioned by the top energy, ecology and economy contribution to preservation of the life quality on Earth [1,2].

Formally, each vehicle is an answer of the engineer to obligations dictated by a project task. Different vehicles and various models have a lot of similarities, but there always is one guiding idea. Thus, when trends in vehicle fuel consumption levels are considered, they may be obtained in several ways. The easiest thing to do is to use statistical data from the reliable resources. The other way is to perform a structural analysis of the vehicle's conception. The following key sets influence the fuel consumption:

- drive unit with complete list of fuels and lubricants,
- mass of the vehicle and its equipment, aerodynamics, cross-sections of head surfaces,
- drive train, wheels and road surface and
- driving technique, maintenance and exploitation conditions.

Although this classification seems logical, it does not include the mutual isolation of these sets. Significant decrease in fuel consumption in IC engine type of drive units of motor vehicles is possible only with application of variable mechanisms: variable displacement, variable compression ratio, variable intake manifold, variable valve timing, variable valve lift, variable geometry turbochargers, variable air fuel mixture ratio and optimal combustion process, Figure 1 [3].

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