DESIGN OF THE MOTOR VEHICLES FROM THE ASPECT OF HIGH STRENGTH STEELS APPLICATIONS

Andreja Ilić [1], PhD student, ***Lozica Ivanović***, PhD associated professor,
Danica Josifović, PhD full professor, ***Vukić Lazić***, PhD full professor

UDC: 621.112

INTRODUCTION

The present motor vehicle industry is focused on developing vehicles with higher safety, reduced fuel consumption, improved reliability by production processes that are more cost efficient. Those demands are opposite by nature with very complex interactions. The partial solution of problems can be accomplished through optimization of design and the continuous usage of newer, lighter and stronger materials. The controls of raw and prefabricated materials, so as their processing technology, come to the focus of testing methodologies. The listed tendencies at the area of motor vehicle industry cause the improvement of existing technologies, so as the development and differentiation of new, advanced methods of elements' joints realizations. In addition, the analyses of demands which are founded in vehicle design, at automotive industry especially, show that modern vehicles have, beside the primary function, numerous and very different additional functions. From the other side, they have to fulfill very strict requirements, which are fundamentally different. The estimated requirements and criterions often have complex system of interactions. All the presented facts must be adequately considered in the process of the vehicles design.

The present materials that are used for modern vehicles are very diverse by nature. From the aspect of design, material selection is one of the most important procedure at the process of the product development.

The bodies of first cars were built mostly of wood while engines were made of iron. Later, with evolution of vehicles, the steel body panels were used on wood frames with steel body panels. At the early years of 20th century the principle of body on frame was used at the current design of the vehicles. Those vehicles had chassis that supported all the parts and the body that was made of steel. Current design uses monocoque body solution especially for passenger cars and small sport utility vehicles. Heavy vehicles like trucks and busses uses the bodies on frames design solutions.

The steel is dominant material for making present vehicles due to specific characteristics and properties. With evolution of steel grades to high strength low alloyed steels and application for vehicles this steel grade become most important material. High-strength steels are the materials that fulfill the requirements for mass reduction, improve energy efficiency, reduced fuel consumption in present vehicle industry without compromising in safety and affordability. The lightweight capability of high-strength steels resulted from theirs microstructure, obtained through highly controlled production processes and combinations of micro alloying elements. Very beneficial combination of strength and ductility of high-strength steels implicate that this steel grade must be considered differently from the other steel grades during design process. This fact is the basis hypothesis for this

[1] Andreja Ilić, PhD student, Faculty of Engineering, Sestre Janjić 6, 34000 Kragujevac, Serbia, e-mail: gilic9@sbb.rs