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**DEVELOPMENT OF A PASSIVE SAFETY SYSTEM FOR THE FRONTAL
CRASH ENERGY ABSORPTION IN ACCIDENTS INVOLVING
INTERCITY BUSES**

ABSTRACT

When bus accidents are analyzed, it can be seen that the frontal crash accidents constitute an important part of the whole accidents involving buses. In case of a possible frontal crash bus accident, the vehicle front body is exposed to serious amounts of crash energy. As a consequence of this energy, the bus structure deforms and more importantly, the bus driver and the crew may seriously get injured. Keeping the bus under control during the accident and thus ensuring the safety of passengers is directly related to the safety of the bus driver. Thus ensuring the safety of the bus driver is a critical issue. In this study, bus structure was both analyzed numerically and tested experimentally in the case of a frontal crash accident scheme according to the international ECE R-29 regulation which is compulsory for heavy vehicles. Numerical studies include both the analyses of the whole bus structure and the investigation of energy absorption characteristics of the energy absorbers having different cross-sections. As a result of the numerical studies and experiments of the bus structure, it was seen that the ECE R-29 requirements were not satisfied. Primarily, the weak regions of the bus structure were determined and improvements of the necessary regions are provided. These improvements consist of changing the wall thicknesses of the some present profiles, relocating necessary profiles and adding new support structures to strengthen the bus body. After improving the structure different energy absorbers were designed and the bus body has been reinforced with these energy absorbers. Due to these energy absorbers the survival space for the driver was ensured which is the requirement of ECE R-29 regulation.

Keywords: Passive safety systems, Frontal crash, Energy absorbers, Ls-Dyna, ECE R-29.