

BUS PASSENGER VIBRATIONAL COMFORT

DR ĐORĐE DILIGENSKI, senior research officer, "Vinča" Institute of Nuclear Sciences, Dept. for I.C. Engines and Vehicles, Belgrade, Serbia and Montenegro

PROF. DR MIROSLAV DEMIĆ, academician, Faculty of Mechanical Engineering Kragujevac, Serbia and Montenegro

ŽELJKO ŠAKOTA, M.Sc., research officer, "Vinča" Institute of Nuclear Sciences, Dept. for I.C. Engines and Vehicles, Belgrade, Serbia and Montenegro

REZIME: Cilj ovog istraživanja je razmatranje parametara vibracione udobnosti u funkciji koncepcije autobusa, odnosno položaja pogonske grupe, brzine kretanja i kvaliteta kolovoza, kako bi se omogućila optimizacija udobnosti u ranim fazama razvoja. U okviru eksperimentalnog istraživanja primenjene su objektivne metode analize uticaja koncepcije autobusa na vibracioni aspekt udobnosti putnika. Na dva autobusa, najčešće primenjivanih koncepcija: jedan je sa pogonskom grupom ugrađenom u zadnjem prepustu vozila i drugi sa potpodnim smeštajem pogonske grupe između prednjeg i zadnjeg mosta, izvršena su merenja empirijski odabranih objektivnih veličina u eksploatacionim uslovima. Na tri merna mesta: na prednjem prepustu, u sredini međuosovinskog rastojanja i na zadnjem prepustu, registrovana su vertikalna i horizontalna ubrzanja putnika. Putni uslovi su bili zastupljeni sa tri tipa kolovoza i četiri brzinska režima kretanja autobusa. Metodom korak-po-korak praćeni su tokovi prenošenja vibracija od izvora poremećaja do putnika, a merena su i ubrzanja osovina, motora i poda autobusa, kako bi se identifikovale relacije između izvora poremećaja stanja i karakterističnih frekvencija vibracija. Eksperimentalni rezultati su dati u grafičkom obliku i pokazuju uticaj pojedinih relevantnih parametara na vibracionu udobnost putnika.

SUMMARY: The objective of this research is to consider parameters of vibrational comfort as related to the bus layout, i.e. effect of the position of power-train, speed and road surface in order to delineate the essential steps in the design process contributing to the vehicle's comfort thereafter. Objective methods of analysis were applied within the experimental research in order to conceive how the bus layout, i.e. position of the power-train, affects parameters of passenger vibrational comfort. Two basic bus layouts were subjected to the analysis: one with the power-train installed in the rear overhang of the bus and the other with the underfloor engine installation in the wheelbase area. Selected variables were recorded in various service conditions: at three different spots in the bus, on three types of road surface and four different constant speed regimes. Axles, engine and bus floor accelerations were measured so as to enable "step-by-step" analysis of vibration paths and help identify relations of characteristic vibration frequencies to the specific disturbance sources. The experimental results are given in a graphic form showing the influence of various relevant parameters on passenger vibrational comfort.

Key words: bus, vibration, comfort