PERFORMANCE TESTING OF HYBRID VEHICLES IN BARI DOWNTOWN

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Abstract: In this paper two consumption cycles for passenger cars are proposed, that have been studied and tested utilising two commercial hybrid vehicles provided by the manufacturers. Two HEVs have been considered: a Toyota Prius and a Honda Civic IMA. The former belongs to the series/parallel typology, whereas the latter is classified as a parallel hybrid.
The route of the first cycle is all included in the central area of the town of Bari (IT), whereas the second route involves the suburban area of the same city. The aim of the experimental investigation has been that of analysing the vehicles' performances in this two situations and comparing the results, obtained using the aforementioned cycles, with those achieved using the ECE 91/441 cycle and further modifications. The norm, indeed, has been developed with the aim of testing vehicle performances in repetitive conditions and, hence, in labs equipped with climatically controlled chambers. For this reason the ECE cycle is far from the effective vehicle operative conditions. This important aspect has been faced by many researchers all over Europe, leaded by TNO (NL), who recently designed the ARTEMIS driving cycle, which is a modern and realistic alternative to the one supplied by the ECE norm, actually involved in the development of the new EURO 5 standard rules.
The survey points out, first of all, the main differences, in terms of performance, related to the two HEV architectures utilised. More over the analysis also put in evidence how far the effective fuel consumptions, measured following the cycles here proposed, are from those evaluated by manufacturers according to law. At last considerations regarding the maximum amount of regenerative energy theoretically obtainable are reported.

Keywords: HEV, series/parallel hybrid vehicles, ECE 91/441 cycle, regenerative energy, fuel consumption.