

ENVIRONMENTAL PERFORMANCE OF RETREADED TYRES

EFICACIA MEDIOAMBIENTAL DE LOS NEUMÁTICOS RECAUCHUTADOS

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Regulations R(EC)661/2009 and R(EC)1222/2009 established environmental requirements for new tyres and their labelling, not applicable to retreaded tyres. However, in anticipation of future revisions, different studies were promoted, mainly aimed at truck tyres, the main market for retreaded tyres. Two lines of research were opened at UMH, focusing respectively on the study of rolling resistance and rolling noise. The most innovative results are related to the experimental methodology developed, and the comparative study of rolling resistance coefficients (RRC) and rolling noise of new and retreaded tyres for passenger cars.

Rolling resistance

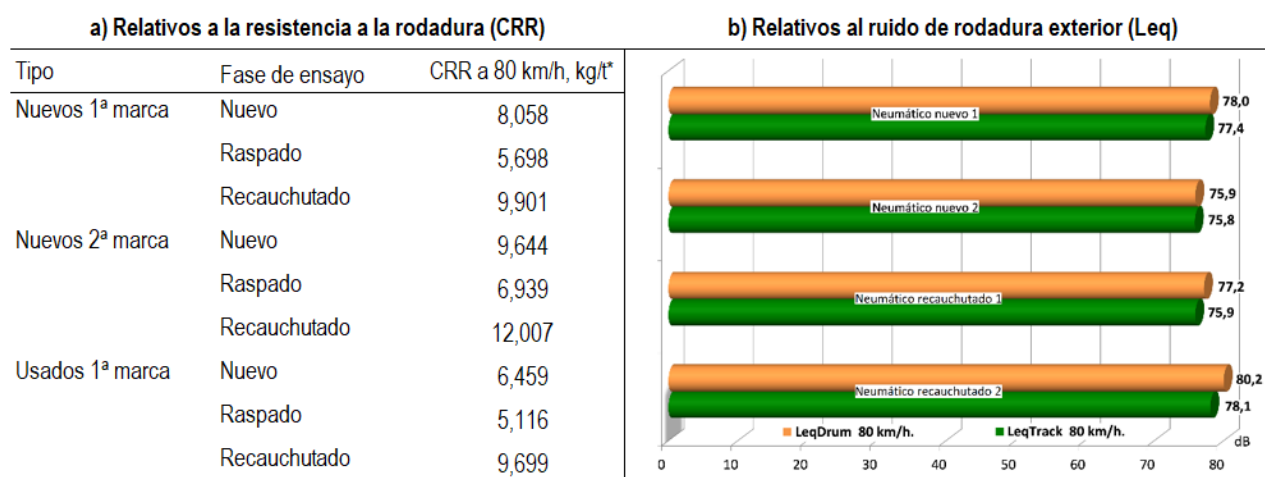
A new methodology was developed to analyse separately the influence on the RRC of carcass and tread, as well as the effect of different parameters such as the type and condition of the carcass used, the material added and the retreading process [1].

In retreaded tyres, the most influential factor is the added material in the tread. Comparing equivalent passenger car tyres, 47% of the RRC of the retreaded tyre is due to the tread, compared to only 29% influence of the tread for new tyres.

Combined with the other factors, the RRC increases by an average of 60% compared to a new tyre with the same casing (see Figure 1a). However, the RRC obtained [1,2] is of a comparable order to the average RRC obtained for new tyres of second brands which, at the time of the experimental phase of the study, could still be found on the market labelled as F class. Considering the entire life cycle, the environmental advantage of retreading is obvious.

Today it is no longer allowed to sell new tyres with a CRR of more than 10.5 kg/ton. Therefore, regardless of whether environmental labelling is applicable or not, retread manufacturers are working to reduce their CRR in order to maintain their image and competitiveness. This involves detailed analysis and improvement of materials and processes, and rigorous selection of used casings, to reliably reduce and predict the CRR.

Figura 1. Principales resultados promedios de los neumáticos de turismo



* 1 kg/t = 1 kN/N

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Rolling noise

Rolling noise is the main source of noise emission from road traffic at speeds above 30 km/h. In the last decades, several track test methods have been used to measure it (Close-Proximity, Statistical Pass-By, Controlled Pass-By, or Coast-By, the only one accepted for type approval). These methods have disadvantages such as the lack of repeatability due to the influence of environmental, track and test vehicle factors. Furthermore, they only consider sound pressure, which depends on factors that are not strictly controlled, such as the environment, attenuation or distance from the source, and do not allow to quantify sound power.

The Alternative Drum method [3] is a new methodology for measuring the sound power emitted by a tyre on a drum test bench, combining the experience of the ISO 3744 and ISO 9613 standards with the experimental procedure developed at the UMH. The new method has been validated by comparison with the results obtained on a large sample of new and retreaded tyres [4].

The results obtained allow us to conclude that the test method is valid for all types of tyres, and that retreaded tyres are not necessarily noisier than new tyres (see Figure 1b).

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