SUMMARY

Noise is considered as an unpleasant and undesired audio sensation, and constitutes an important environmental issue. It has an impact on the health and behaviour of specific individuals, as well as their social groups, due to the effects it has on their physicality, their psyche and/or social interaction.

In comparison with other polluters of the environment; noise control is not entirely sufficient in all cases, due to lack of knowledge regarding the negative effects of exposure, and the particular characteristics of noise, where the contamination begins at the moment when the source first emits noise, and ends as soon as it stops, leaving no residual trace, but only an accumulation that moves in a logarithmic system and that is dispersed with distance.

With this in mind, the principle aim of this doctorate thesis is to establish a methodology to capture information from audio data, in order to acknowledge traffic noise behaviour during manoeuvres such as braking, accelerating and vehicles in motion; using different types of traffic calming devices in order to create behavioural models of the noise produced by the vehicles against speed, the characteristics of the road, type and geometry of the traffic calming device and the type of vehicle.

For the above reasons, an analysis of multiple speed profiles related to traffic calming devices has been established with the aim to estimate the main points in the approaching, passing and acceleration manoeuvres over these devices. Once such points were established, a methodology was designed to gather noise data and speeds over these points. The tests were carried out over the most common traffic calming devices such as speed bumps, speed humps and speed tables.

All of the data from the experimental execution has been processed with the aim to determine speeds related to specific noise data. With this information, an analysis of the principle noise indices has been completed, as well as an analysis of set velocity and statistical estimation used to profile the different variables to establish interconnectivity and relations between them.

Ultimately, all of the data gathered has been used and adequately employed in order to calibrate the final models representing the behaviour of noise within the main points of the velocity profile, for the different types of vehicles against the differing traffic calming devices that were analysed.