

NOISE IMPACT CATEGORY IMPLEMENTATION IN A LIFE CYCLE ASSESSMENT SOFTWARE TOOL TO ASSESS ROAD RESTORATIONS

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INTRODUCTION & OBJECTIVE

Several difficulties have arisen in the inclusion of road traffic noise as an impact category within the LCA method. There are many reasons for this marginal treatment of noise in LCA. Main reasons are related to the special characteristics of noise as a pollutant, such as the site-dependency of impacts, the human perception issues or the non-linearity of impacts and limited availability of data, which have hindered its inclusion within this method. Nevertheless, some specific studies within the LCA framework aimed to better accommodate the assessment of its impacts have appeared so far. Most of them have been focused not just in traffic noise but also in noise from any other source.

This proposal has been developed under the framework of a Spanish R+D (2015-19) project, REPARA 2.0, whose main aim is to research and develop new materials, such as sound-reducers blends from recycled materials and special emulsions, to improve the road restoration activities.

This study presents how the endpoint extended method of Moliner *et al.* [1], considering the human health impact of noise, could be implemented in the software tool Air.e LCA®.

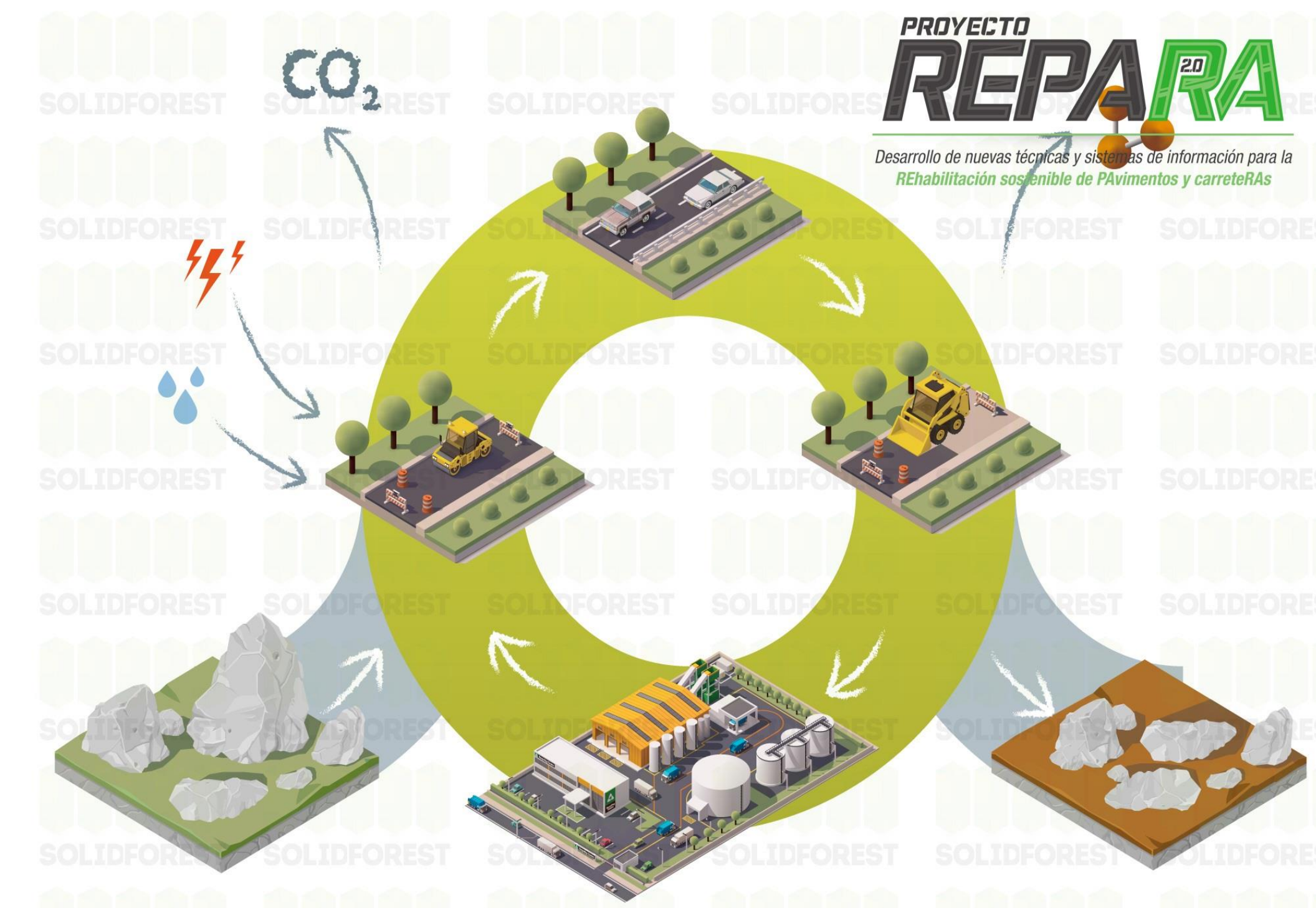


Figure 1. Life cycle of road construction and maintenance, which includes road restoration activities [www.proyectorepara.com].

MATERIALS & METHODS

Figure 2 shows the application of Moliner *et al.* [1] method in case of road restorations. The decremental approach saves modelling efforts: the assessments can be performed without modelling the sound propagation, requiring only a traffic noise emission model, CNOSSOS [2] in this case, to calculate the variation of noise levels (ΔL_{den} and ΔL_{night}). Traffic and noise exposure data remains constant. Exposure to noise levels is determined by noise prediction models.

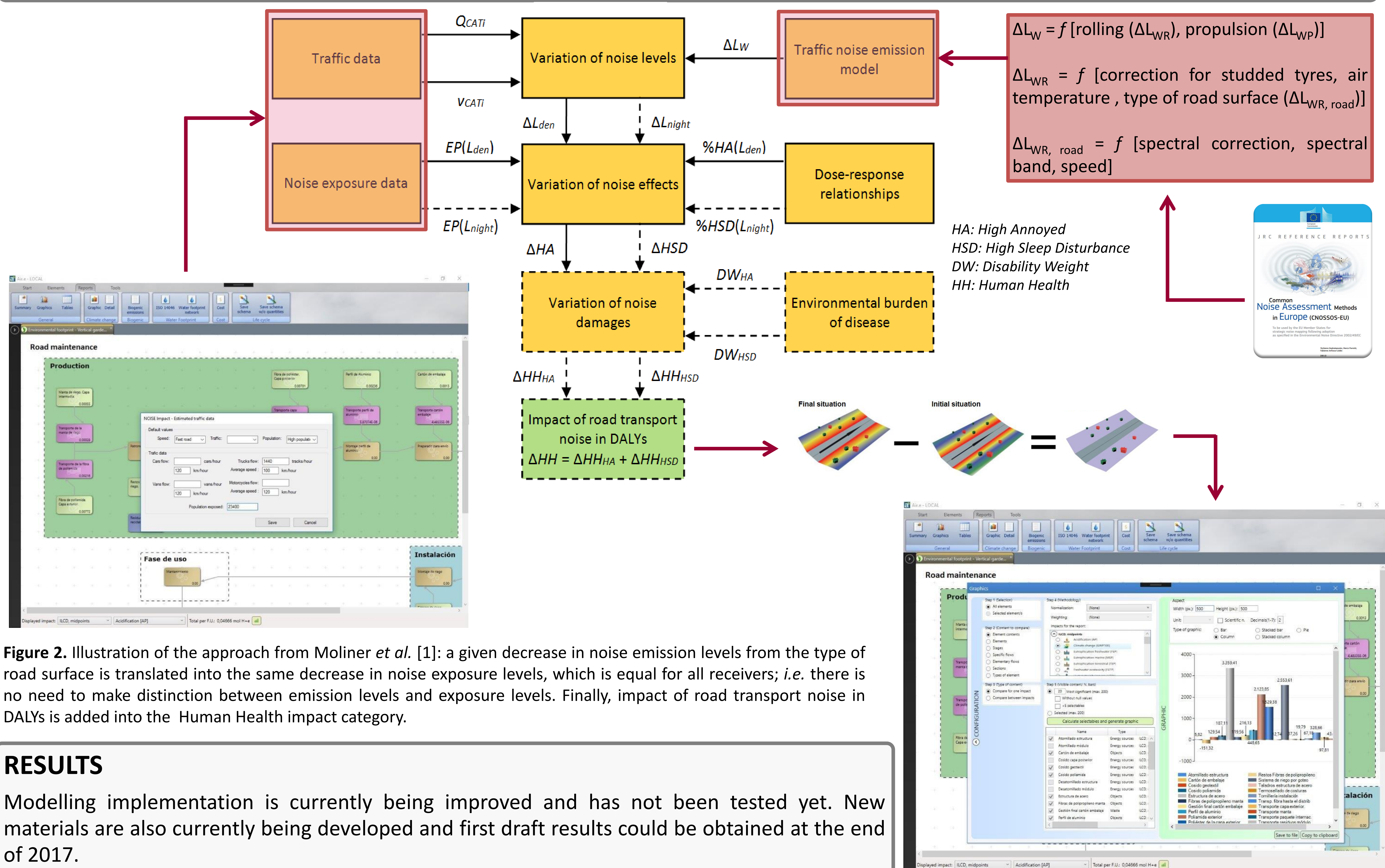


Figure 2. Illustration of the approach from Moliner *et al.* [1]: a given decrease in noise emission levels from the type of road surface is translated into the same decrease in noise exposure levels, which is equal for all receivers; *i.e.* there is no need to make distinction between emission levels and exposure levels. Finally, impact of road transport noise in DALYs is added into the Human Health impact category.

RESULTS

Modelling implementation is currently being improved and has not been tested yet. New materials are also currently being developed and first draft results could be obtained at the end of 2017.

CONCLUSIONS

- The noise impact has significant relevance in comparison with other impact categories typically assessed in LCA, which justifies its consideration as a usual impact category.
- The fact of including the noise impact assessment in LCA of road restorations will contribute to compute the benefits to human health of developing and using new sound-dampening, sound-reduction or anti-noise materials into road surface.

REFERENCES

- [1] Moliner E, Vidal R, Franco V, Garrain D. A method to assess the impact of road transport noise within the framework of Life Cycle Assessment, DYNA Ingeniería e Industria, January 2014, Vol. 89, pp-77-84. <http://dx.doi.org/10.6036/5804>
- [2] Kephapopoulos S, Paviotti M, Anfosso-Lédée F. Common Noise Assessment Methods in Europe (CNOSSOS-EU), Publications Office of the European Union, JRC72550, ISBN: 978-92-79-25281-5, 2012. <http://publications.jrc.ec.europa.eu/repository/handle/JRC72550>

