

# IMPLEMENTATION PROBLEMS OF IMAGINE NOISE SOURCE MODEL FOR POLISH PASSENGER TRAINS

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## 1. INTRODUCTION

The aim of this study is to check whether the noise source model implemented in IMAGINE project is applicable to Polish railway conditions. The analysis performed is a part of the project devoted to monitoring of environmental noise. IMAGINE noise source prediction model implementation based on reference data of that model is presented along the main objectives of the realized study. The model implementation is compared with the measurement results and discrepancies between prediction and measurement results are determined. Modeling is performed for the same measured atmospheric conditions. Problems of reference data that are not fully applicable to Polish railway structure are described in details. Moreover, the problem of a proper assignment of the distance between the noise meter location and the track centerline is also discussed. A possibility to apply this method to dynamic noise mapping is also discussed.

## 2. STUDY OBJECTIVES

It is vital to find a solution of the environmental management in the way that it enables to reduce the noise level. For that reason the process of noise prediction started to be thoroughly reviewed and implemented. Every prediction model requires to characterize in detail the cause of the noise generated. On the other hand it is important to issue noise maps that can be compared with the results obtained in other countries. Therefore, it is essential to find which parts of the source, for example regarding railway, and in which conditions are generating noise at levels that cannot be tolerated. Then based on the above assumptions a universal model applicable to any country should be created. The European Directive on the Assessment and

Management of Environmental Noise (END), from 2002 indicated clearly these issues. In order to fulfill these requirements it was necessary to evaluate national noise prediction methods used in particular countries according to the directive mentioned. It occurred that none of the models fulfill the requirements of that directive. That is why an initiative called HARMONOISE/IMAGINE came into existence. The study here presented is a part of large project devoted to multimedia computer system for monitoring of environmental noise. Implementation of noise telemonitoring system may contribute to the increase in consciousness of society and authorities concerning influence of noise on health.

## 3. CONCLUSIONS

The implementation of IMAGINE project reference data to the conditions of Polish railways show some discrepancies in the approach. That is why measurements were performed. Measurements and calculations were performed for the same locations and the same time interval. The main part of the calculated noise level was the rolling noise. Adding to the source model the traction and the aerodynamic characteristics caused the increase of the generated noise level by approx. 9 dB (without propagation the part). In the study presented in this paper the main consideration was to discuss the accuracy of the source model for a specified period. The precision was not as good as in IMAGINE project validation scheme, where the inaccuracy was as low as 1 dB. However, the results obtained show that the reference data from IMAGINE may be applied with some corrections to the Polish passenger train conditions.