ARUP

Subject	Comment on Professor Buckley's letter of 21 February 2017		
Date	6 March 2017	Job No/Ref	H07-OB

The following notes are in response to Prof. Buckley's document titled "*To members of the West Area Planning Committee, for Agenda Item 3 of the meeting on 21 February, 2017*". In the document Prof. Buckley questions the evidence surrounding the assumption that 2.5-3dB is a reasonable estimate of the noise reduction that will be achieved with SilentTrack. Prof. Buckley points out that the evidence used to support the assumption[1] was for a Franco-German project called STARDAMP and claims that Prof. David Thompson has advised him that, while not discussed in the paper, the study assumed parameters for train wheels that are more applicable for German trains than UK trains. He says that Prof. Thompson estimates that if UK wheels had been simulated a noise reduction of 4.4dB would have been obtained.

This finding highlights that the performance of rail damping products are highly sensitive to the context in which they are installed. The performance of a rail damper is dependent not only on the damping product but on the type of track and rolling stock as well as their condition. In our note H04-OB we advised that the performance presented in [1] was a reasonable estimate of performance for use in the context of a WeBTAG analysis on the basis that the design parameters of the track were appropriate for the type of track to be installed on the East West Rail Scheme. At no point have Arup been asked to provide our own estimate estimate of rail damper performance for EWR, we have only been asked to comment on NRs evidence. In H04-OB we also noted that further prediction work, undertaken according to the methodology defined in [1], would be required to provide the best estimate of the performance of SilentTrack on EWR. The information provided by Prof. Thompson's 2013 paper is helpful even though it is given for a different damping product to SilentTrack and for a single type of rolling stock.

Taking the new information provided by Prof. Buckley on behalf of Prof. Thompson at face value, we have no grounds to dispute that this opinion is a better estimate of the performance of rail dampers for some of the rolling stock using EWR. However the operational situation on EWR is more complex because a combination of different types of rolling stock, freight stock and freight locomotives use the railway. The information provided by Prof. Buckley does not address this complexity and therefore will not necessarily translate to EWR.

As already stated, the best estimate of the performance of rail dampers would require further testing and prediction work to be undertaken according to the methodology described in [1]. This would involve laboratory testing of the SilentTrack damper on short sections of track together with noise predictions for the damper using TWINS[2] (or similar) which consider all types of rolling stock using EWR. This would provide an estimate of the rolling stock specific noise reduction that could be achieved with SilentTrack. Alternatively rail roughness, rail decay rate and noise measurements on the operational EWR combined with TWINS modelling could be used to estimate the rolling stock specific performance of SilentTrack. To assess the benefit at noise sensitive receptors using WebTAG, the noise modelling undertaken by ERM would then need to be corrected to account for the rolling stock specific rail damper performance. Without undertaking this work it is not possible to say whether it would affect the conclusions of the assessments to date.

[1] M. G. R. Toward et al. Estimating the performance of rail dampers using laboratory methods and software predictions. Proceedings of the 11th International Workshop on Railway Noise, 9-13 September 2013 at Uddevalla in Sweden
[2] Thompson, D.J. et al.: Experimental Validation of the TWINS prediction programme for rolling noise, PART 1: Description of the model and method, Journal of Sound and Vibration. 193: 123-35 (1996)

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In summary, the information provided by Prof. Buckley highlights that estimating the actual performance of rail dampers on EWR is complex because a combination of different types of rolling stock, freight stock and freight locomotives use the railway. Further technical work that considers these complexities would be required to provide the best estimate of rail damper performance on EWR. Without undertaking this work, the alternative performance estimate provided by Prof. Buckley should be taken into account as a potential outcome for the performance of rail dampers on EWR, albeit for a different damping product to SilentTrack and for a single type of rolling stock.