

Abstract:**The investigation of noise generated between rail and wheel, with trains running in the curves and the investigation of its reduction because of using an anti-noise device (CL-E1top) and lubricating device (CL-E1ws)**

Measurement of noise reduction was performed at the two measuring points in Dražica and Ohonica near the city of Borovnica where the railway line from Ljubljana to Pivka makes a long sharp turn, therefore the direction of travel changes by approximately 180°. This railway is constructed with two lines which are spaced a certain distance from each other, where the left track is type S49 and the right track is type UIC 60. The first measuring point (MM1) was located in the village Ohonica and was 7 metres away from the first track at a height of 2 metres from the plane of the railway line. The second measuring point (MM2) was in the village of Dražica, at a height of 4 metres and at a distance of 8 metres from the nearest track. The radius of curve in this part of the track is 298 meters. Measurements were carried out in the normal rail traffic on the route through Dražica village continuously with modular sound detectors B & K 2250 and 2270 and with programmed modules.

During the research we determined the reduction of noise levels due to the use of special material - CHFC (Composite Heavy Fluid Compounds) material, which contains a high amount of solid particles. Application of CHFC material was automatic, by using the lubricating device CL-E1ws (application on the edge of the railhead) and by using anti-noise devices CL - E1 top (application on the top and on the edge of the rail head).

Measurements were performed three times: 1 when there were no installed devices, 2 when the lubrication device type CL - E1ws was installed and 3 when the anti-noise device type CL - E1 top was installed.

In the study we had, by using the anti-noise device CL-E1 top, achieved up to a 14 dBA noise reduction at low frequencies and up to a 30 dBA noise reduction at high-frequencies, as is evident from Figure 1 and 2 . Minor noise reduction has also been achieved with the use of lubricating devices CL-E1ws, because the CHFC material applied to the edge of the track heads has reduced the vibration shocks and friction and, consequently, the noise level. The results of this analysis confirmed the hypothesis that, by using appropriate materials (CHFC materials) and technology (CL-E1top,) a very high reduction of high frequency noise can be achieved in the curve and with a load the noise is noticeably lower. The exceptional results achieved in this study indicate that it is reasonable to continue with the installation of devices in other noise congested sections.

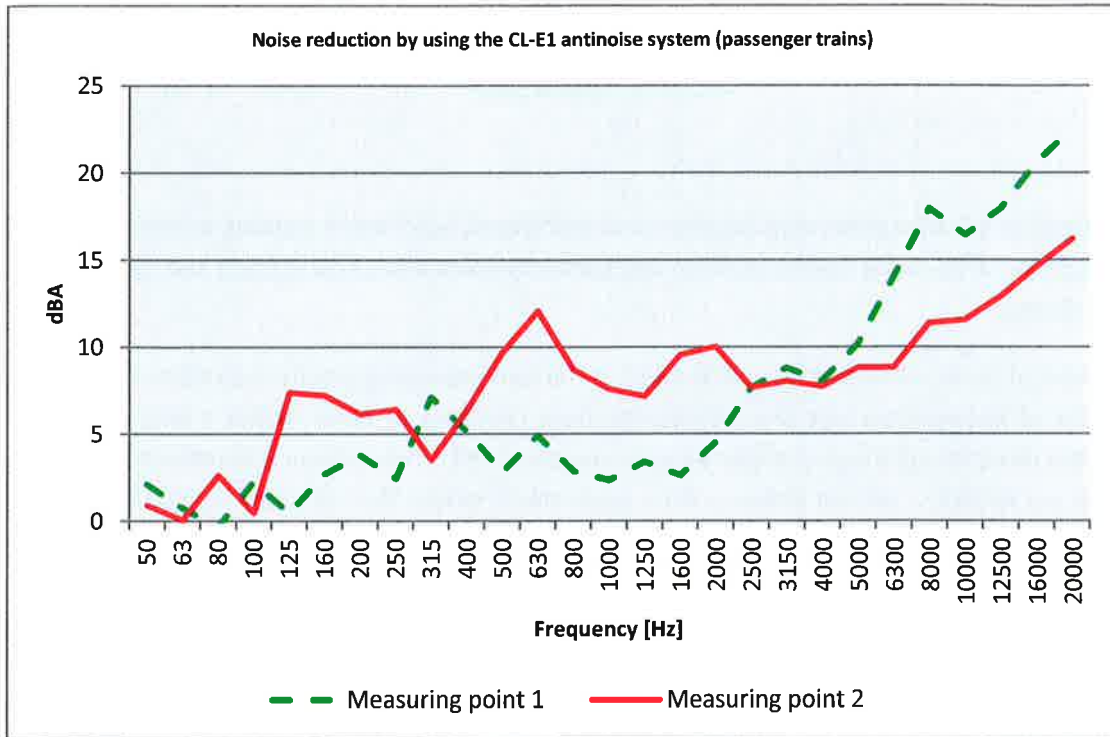


Figure 1: Noise reduction by using the CL-E1 antinoise system (passenger trains)

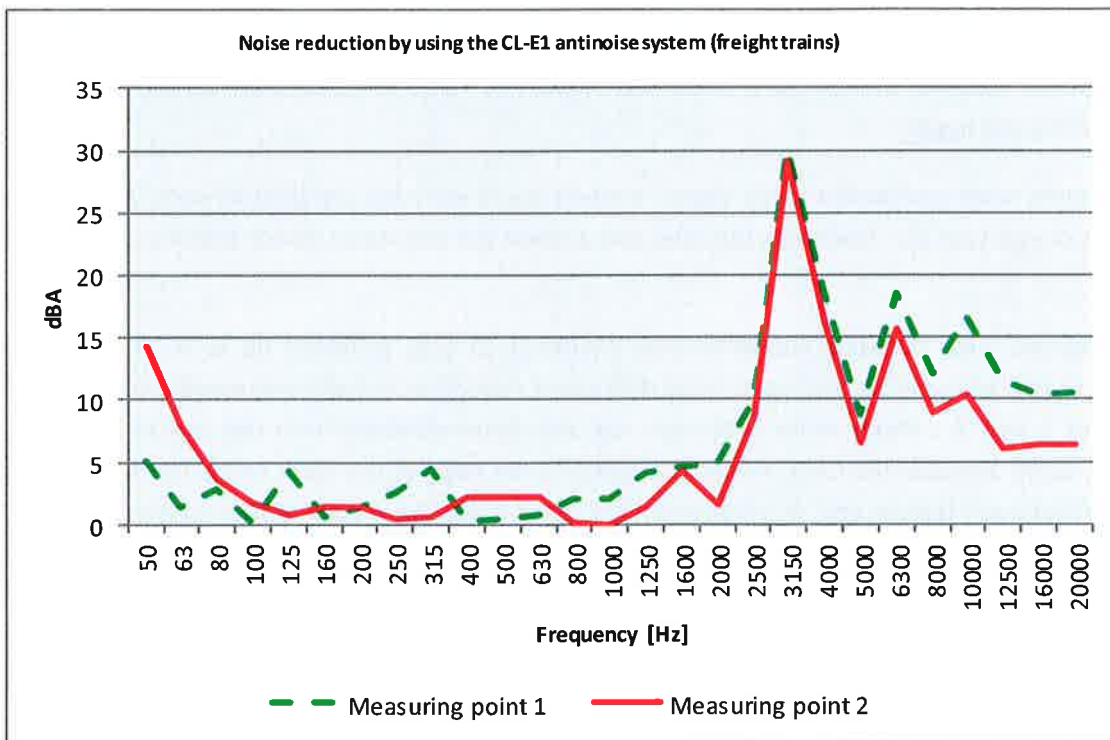


Figure 2: Noise reduction by using the CL-E1 antinoise system (freight trains)

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