



### **UBA proposes evaluation of flat spots according to "acoustic conspicuousness"**

**Noise protection** A train passing with a flat spot is perceived as equally annoying as a much louder train passing without a flat spot. This is the result of the report "Measurement of flat spots and determination of an acoustic maintenance criterion" commissioned by the Federal Environment Agency (UBA). The total level of the louder train without a flat spot can therefore be 25% higher than the additional noise (delta) caused by the flat spot in the maximum level to be comparably annoying as a passing train without a flat spot. Twenty test subjects were interviewed who were exposed to the noise of different flat spots. According to the authors (Ingenieurbüro Möhler + Partner), it would be conceivable to use a "level surcharge" to reflect the "acoustic conspicuousness" of the flat spot in regulations: Train passages with flat spots could be given a surcharge amounting to 25% of the maximum level difference between a train passage with and without a flat spot. The corrected value would then be comparable with common limit values. The annoyance of a flat spot could be captured by its "acceptability". In the study set-up, subjects had to rate flat spot noise as "acceptable" or "unacceptable". For 50% of the test subjects to find a flat spot acceptable, the A-weighted maximum level triggered by flat spots may be 85 dB(A), for 30% acceptance about 86.5 dB(A). Converted to a continuous sound level - as specified in the TSI Noise - this would correspond to 83.5 dB for 50% acceptance and 85 dB for 30%. Currently, the limit for freight wagons is 83 dB. According to the study, the acoustic annoyance of a flat spot also depends on the 2 kHz octave level and the fluctuation strength. To detect acoustically conspicuous flat spots, monitoring on the infrastructure side is proposed. The legal framework could be adapted so that not only dimensions but also "acoustic criteria" make a flat spot a safety-relevant defect. Trains on the Munich-Rosenheim line were observed for the study. Within one month, 30.45% of the 24197 recorded freight wagons had a flat spot.