

## EXPOSURE TO RAIL TRAFFIC NOISE

From certain thresholds upwards, environmental noise causes annoyance but also has adverse effects on sleep, cognitive functions and the cardiovascular system of the individuals exposed to it. Rail traffic is the second largest source of environmental noise in Europe after road traffic<sup>1</sup>.

To reduce the effects of environmental noise, legislation<sup>2</sup> requires (i) a mapping of noise exposure, (ii) public information on noise exposure and its effects, and (iii) the implementation of action plans. Two indicators have been selected to establish noise exposure mappings:  $L_{den}$  and  $L_{night}$ , which were designed to respectively assess annoyance and sleep disturbance due to noise. These indicators represent the annual average noise levels in dB (A) over all periods of day, evening and night ( $L_{den}$ ) and during night periods ( $L_{night}$ ). Noise effects on sleep are observed below 40 dB (A)  $L_{night}$  while the risk of hypertension, coronary heart disease and stroke increases from 50 - 55 dB (A)  $L_{den}$ <sup>1</sup>. According to WHO<sup>3</sup>, the average annual nocturnal exposure at night should not exceed 40 dB (A).

### Cumulative delays

The Walloon mappings<sup>4</sup> of noise exposure along major railways<sup>5</sup> were anticipated<sup>6</sup>: (i) in 2007 for railways with rail traffic exceeding 60,000 trains per year (131 km of railways) and (ii) in 2012 for railways with rail traffic between 30,000 and 60,000 trains per year (592 km of railways). The first map was finalised in 2008<sup>7</sup>. The second map, which was accompanied by an update of the first, was finalised in 2016<sup>8</sup>. The corresponding action plans were anticipated<sup>2</sup> in 2008 and 2013. A first comprehensive plan should be approved by the Walloon Government in 2018, as well as limit values beyond which noise reduction measures will have to be taken.

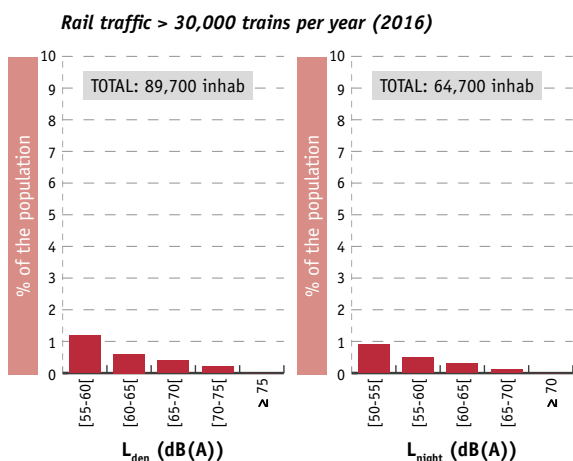
### Nearly 90,000 inhabitants affected

According to the map drawn up in 2016, approximately 89,700 inhabitants are exposed to more than 55 dB (A)  $L_{den}$  along railways with more than 30,000 passing trains per year, considering only this noise source. Nearly 64,700 inhabitants are exposed to more than 50 dB (A)  $L_{night}$ . A comparison of the 2008 mappings (>60,000 trains/year) and 2016 mappings (>30,000 trains/year) shows that the number of people exposed to more than 75 dB (A)  $L_{den}$  and more than 70 dB (A)  $L_{night}$  decreased by 65% and 88%. This decrease seems to be linked to the phasing-out of freight trains since 2011 (often at night) following the closure of steelworks in Liège and Charleroi.

### Modernise, maintain and equip

Noise reduction is less expensive at the source<sup>1</sup>. Noise reduction is encouraged at the European level by (i) the adoption since 2014 of a technical specification for interoperability with regard to noise (TSI noise) for which compliance, or non-compliance, makes it possible to distinguish silent and noisy rolling stock<sup>9</sup> and (ii) the introduction in 2015 of a financial incentive system to speed up the modernisation of rolling stock by replacing cast iron brake pads with composite brake pads enabling compliance with the TSI noise<sup>10</sup>. This system<sup>11</sup> and other proactive policies<sup>12</sup> applied in some countries are already producing effects. In Belgium, Infrabel contributes to reducing noise at-the-source by (i) placing insulating soles between rails and sleepers when renewing tracks, and (ii) optimising rail maintenance by grinding. The expected regional action plan can also be added to these measures, e.g. the installation of anti-noise equipment (panels, embankments, vegetation barriers, etc.).

Fig. HEALTH 2-1 Exposure\* to rail traffic noise in Wallonia



[1] EEA, 2014 | [2] Walloon Government Decree of 13/05/2004 (Directive 2002/49/EC) | [3] WHO, 2009 | [4] Referred to as "strategic noise mapping" according to Directive 2002/49/EC | [5] → Map 47 | [6] Walloon Government Decree of 13/09/2007 | [7] Walloon Government Decree of 12/03/2009 | [8] Walloon Government Decree of 04/05/2017 | [9] Regulation (EU) No 1304/2014 | [10] Implementing Regulation (EU) 2015/429. In contrast to cast iron, composite brake pads keep wheels smooth, resulting in lower rolling noise. | [11] Applied in Germany, the Netherlands, Switzerland | [12] By 2020, freight trains not complying with the TSI noise in Switzerland will be banned.