

ATTEMPT AT NIGHT NOISE CRITERIA FOR BRUSSELS AIRPORT

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Introduction Belgium is a federal state with three autonomous regions: the Flemish, the Brussels and the Walloon region. The federal government is responsible for the general transportation policy and for the operations at Brussels National airport. The regions are responsible for environmental policy and have each their own noise regulations. Brussels National airport has three runways, two of them directed E-W and one NNE-SSW. It is situated entirely in the Flemish region, but at the east side of the Brussels Capital region. Wind direction being predominantly W-SW most of the take-off movements go in the direction of the Brussels city. The environmental permit limits the number of night movements to 25000/year. Night flights are mostly performed by courier services and in 2002 they represented 7.6% of the 256000 yearly movements. Since the beginning of 2000 Brussels noise regulations fine airlines with noisy fly-overs, with the result that since then several political agreements between the federal and the two regional governments try to establish a sustainable noise framework for the night.

Measures To tackle the (night) noise problem at Brussels National airport it was decided to take action in several areas. The most important ones are given below.

Measures at source:

From 2003 all aircraft with a noise emission level resulting in a quota count $QC > 12$ are forbidden between 11 pm and 06 am ($QC = 10^{(G-85)/10}$ with G for landing = ICAO certified noise level in EPNdB – 9 dB, G for take off = $\frac{1}{2}$ [ICAO certified noise level in EPNdB take off + noise level lateral]). In practice this means that aircraft types as e.g. A300 and MD11 are still allowed, but that the (hushkitted) B727 is forbidden. In addition the total seasonal QC for take offs has to be lowered to 48000 for the summer of 2003 and airport charges during night time were raised.

Technical and operational measures:

Procedures for landing and take off were examined to optimize them in relation to the number of people living in the noise contours. Keeping in mind an insulation programme (see below) for the surrounding area it was decided to concentrate all take offs on one runway (25R) and landings on another (25L). New departure paths (SID) were developed resulting in a very narrow and curved flight path, with higher noise levels in a central region but less noise exposed surface area and number of people in total.

Town and country planning and insulation programme:

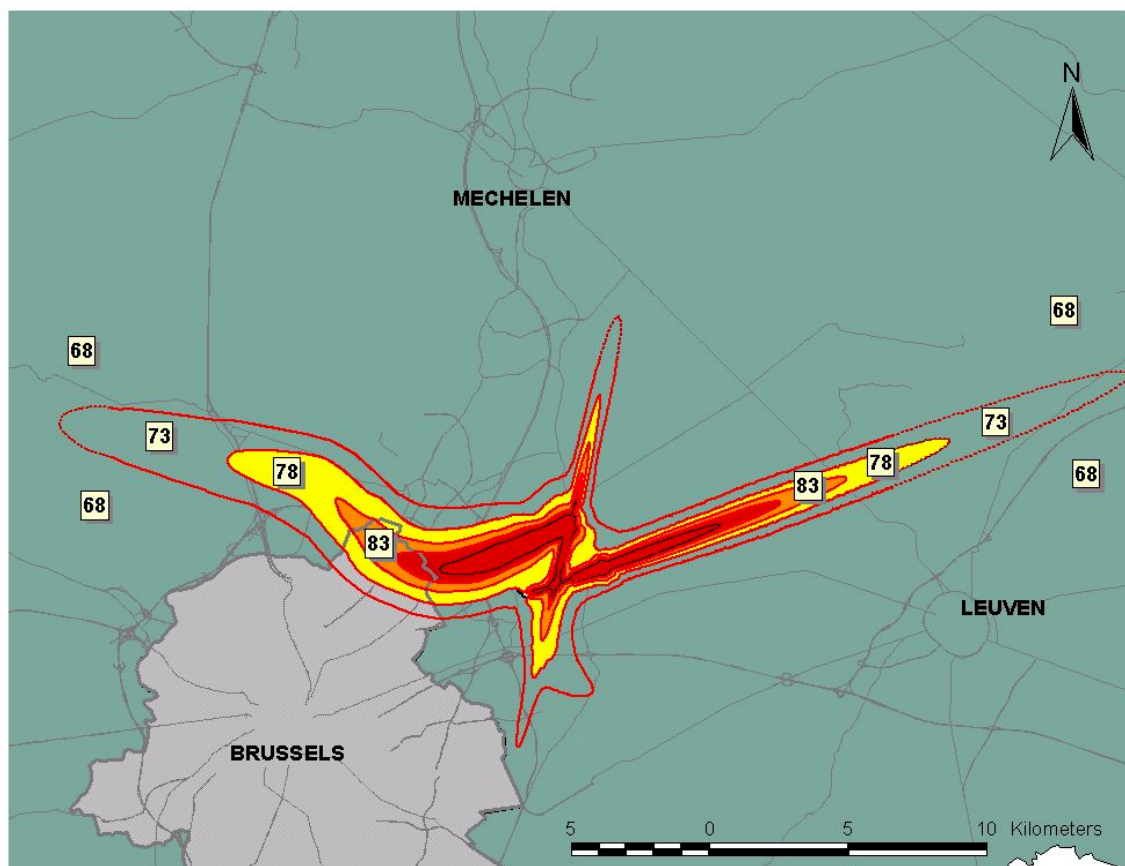
As existing dwellings will have their sleeping rooms acoustically insulated, criteria had to be developed for indoor noise levels with respect to sleep disturbance. The agreement found was that insulation should guarantee an indoor noise level of $L_{Aeq} \leq 26$ dBA over an average night (yearly average, 7 days-week) together with maximum ten events with $L_{Amax} \geq 45$ dBA of which maximum five with $L_{Amax} \geq 50$ dBA over an average weeknight (yearly average, 5 days-week). Similar rules will be developed for new buildings. Owners of dwellings which technically cannot be insulated to the above indoor situation have the opportunity to sell their house to the financial agency in charge of the programme. Except for the most exposed zones, insulation costs are partially paid by the owners.

Relations with the neighbourhood:

A special agency is created to treat complaints. A commission for consultation between local authorities, organisations of neighbours, the different governments, the airport operator and the airlines sits regularly. Noise measurement results are communicated.

Noise immission limits:

The two regional governments (Flemish region and Brussels Capital region) plan to implement joint outdoor noise immission limits for single aircraft flights. The limit values are $L_{Aeq,1s,max} = 68, 73, 78$ and 83 dBA and will be applicable in four immission zones, two of them being situated within the insulation zone and two of them outside (see figure below).



Results An insulation programme for about 12000 dwellings, at a total cost of 152 million euro, is decided to be started in 2004. It is based on indoor noise goals expressed as an average noise level together with a maximum for single noise events and supported by outdoor noise limits for aircraft fly-overs. Unfortunately an early introduction of the new take-off procedures, without complete banning of the noisiest aircraft, has caused strong protest of local action groups. Political decisions may be reconsidered.

Discussion WHO guidelines stress the importance of L_{Aeq} , L_{Amax} and the number of flights to avoid sleep disturbance. However it is not clear how to combine these elements to one criterion. Existing research often refers to average situations over a whole night. As courier services are operating during ± 2 hours at the landing side and ± 2 hours at the take off side this results in a high frequency of flights during these hours and an enhanced sleep disturbance.

Keywords: airport noise, regulation, sleep disturbance