

ANNOYANCE FROM LEISURE AVIATION NOISE

J. Lambert, P. Champelovier, J.C. Bruyère
INRETS-LTE, France

Introduction. Noise from leisure aviation belongs to the kind of noise which does not have obviously the extent of road traffic noise, but which locally and in an intermittent way can be at the origin of significant disturbances. Leisure aviation covers a large variety of flying activities as parachuting, gliding, flying training, recreational flying, aerobatic flying, microlighting, helicopter, aeromodelling etc. The effects of leisure aviation noise often originate in the overflights of dwellings by small and noisy propeller planes, but also operations of towing and dropping of gliders or takeoff and overflights of planes intended for parachuting [1-2-3]. Consequently an increased part of the population living near small general aviation airfields is complaining. The objective of the study undertaken by INRETS in 2001 [4] was the acquisition of knowledge concerning the acoustic aspects as well as the perceptive aspects of leisure aviation noise. The study mainly focused on the identification and on the characterisation of noise situations at the origin of disturbances and annoyance, and also on the identification of the non-acoustic factors associated with the annoyance. On the basis of this knowledge, recommendations were proposed for an improved integration of noise concerns in the development and the management of leisure or general aviation airfields.

Methods. An exploratory socio-acoustic survey (interviews + noise measurement campaign) was performed from April to June 2001 in the vicinity of 2 airfields (Bron and Corbas) located near Lyon (France). 29 residents were interviewed at home during 45 mn (on average). All the interviews were recorded and then analysed by a psychologist. The questionnaire included 33 questions covering the 5 main following items:

- Description of the leisure aviation activities: type of planes, type of flying operations,
- Characteristics and perception of the different noises heard at home,
- Annoyance: times of the day, the week, the year, level of annoyance, activities disturbed,
- Claims and expectations of the residents,
- Individual data: age, gender, length of occupancy, life style, insulation, etc.

Due to the small number of persons interviewed, no statistical analysis was carried out, but only a qualitative analysis.

For each of the 2 airfields investigated, a noise measurement campaign was carried out: long duration measurements (3 months) in addition to short duration measurements (noise events). The aim was to identify and characterize the various sources of noise (in relation to the diversity of planes), to characterize various procedures used for takeoffs, landings and overflights in connection with the various types of planes and their operating conditions, and to assess the noise events as well as the long term noise exposure of the residents.

Results

Noise exposure. Long term noise measurements show a limited number of overflights (15 to 60 per day), occurring only during daytime and principally during the afternoons and the evenings

at the week-ends. Noise levels do not exceed 50 – 52 dB(A) daytime (6a.m –10 p.m) L_{Aeq} , but can exceed 55 dB(A) during one hour. L_{Amax} are in the range of 55 – 70 dB(A), but occur in a low background noise level (35 to 45 dB(A) L_{95}).

During a day, in average, the number of overflights is 1 every 12 to 16 minutes with a 40 to 50 seconds duration in Bron airfield but less in Corbas airfield (1 overflight every 30 minutes, but a 90 seconds duration). For peak days, the number of overflights can go up to 1 every 7 minutes for several hours running (particularly during summer week-ends). Finally, short duration noise measurements show specific low frequencies for gliding planes.

Perception and annoyance. The “touch and go” operation as well as repetitive overflights during consecutive hours are the most annoying events. These events are perceived as most annoying between 10 a.m. and 7 p.m. particularly during spring and summer week-ends. The main activities disturbed are conversation, lunch, reading and rest in the garden. The mean level of annoyance measured on a 11-point numeric scale is 6 for residents living near Bron airfield (highest noise levels – all the residents are annoyed), but only 3 for those living near Corbas airfield (lowest noise levels – no highly annoyed). To sum up, annoyance expressed by the residents is considered more as an event (or instantaneous) annoyance than a long-term negative evaluation of living conditions with respect to noise.

Noise annoyance indices. Event indices (L_{Amax} , SEL, number of noise events) seem to be more relevant than dose indices (L_{Aeq} or L_{DEN}) to describe or assess the annoyance.

Non-acoustic factors. Noise annoyance is due to noise events (intensity and/or number) but also to 4 main non-acoustic factors: the evaluation of the source (leisure aviation is considered by many residents as an “elitist” activity), the fear of a plane crashing (all the planes overflight the houses at low altitude), the visual intrusion (the residents feel to be watched in their daily life by the pilots), the misfeasance with the airfield authorities and the aeroclubs (no or insufficient noise mitigation measures implemented or low compliance with the code of practice).

Claims and expectations. They principally deal with the generalization of the low noise exhaust systems, the respect of the flight paths (in relation with the design of the aerodrome circuit) by the pilots (no overflights).

Recommendations. They concern principally:

- the planes: need to replace noisy exhaust systems by quieter exhaust systems,
- the times of activity: need for flight restrictions at specific times of the day,
- the land planning: need to include leisure aviation noise into revised noise exposure maps,
- the local residents: need to inform them about activities at the airfield and to facilitate their participation to meetings with the aerodrome manager and the operators,
- the aeroclubs and the flying schools: need for a better information to the pilots and to the instructors about noise

Keywords: Leisure aviation, noise, perception, annoyance, management

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