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NOISE ABATEMENT AT GENERAL AVIATION AIRFIELDS IN THE FEDERAL REPUBLIC OF GERMANY

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General aviation contributes considerably to overall air traffic in the Federal Republic of Germany. In addition to eleven commercial airports and some regional airports, there are about 26o general aviation airfields in our country. Of a total of 4.4 million civil flight operations in 198o, about 3 million non-commercial operations were carried out by general aviation aircraft. Although the sound levels of these small propeller-driven aircraft are normally much lower than those of jet aircraft, the responsible authorities received many complaints from the population living in the vicinity of the airfields. As a consequence, the Federal Government stated in its Environmental Program already that the noise of low-flying light aircraft must be considered a major nuisance and that measures for noise abatement at general aviation airfields should be taken.

Initiated by the Federal Ministry of the Interior, a social psychologic study on the nuisance caused by air traffic was carried out by Rohrmann (1) with about 4oo interviews around 4 typical general aviation airfields. The most important result of the study was that about 5o % of the population interviewed considered flight operations with light aircraft as a nuisance, especially because of the disturbance of recreation and rest inside and outside of dwellings and because of the disturbance of communication. This is mainly due to the following reasons:

- Flight operations at general aviation airfields often reach their peak when people are at home and want to rest

or to conduct leisure activities (at noon, in the early evening hours, on weekends).

- Aircraft noise from light aircraft in the vicinity of the airfields reaches maximum sound levels ranging between 5o to 8o db(A). Even at these levels it has to be regarded as an environmental stressor. The irregular occurrence of this noise is not foreseeable nor can it be influenced by the people living around the airfields.
- General aviation airfields are often situated in relatively quiet areas. People who chose to live far away from urban centers generally are expecting a higher environmental quality, including that of their acoustical environment.
- The population living in the vicinity of the airfields expects that noise impact by small aircraft will rather coutinue to increase. After years of exposure, the population at the airfields appears tending to sensibilisation rather than habituation.

Considering measures for the protection of the population, taking into account the results of the Rohrmann study, it was found that noise zoning and sound insulation for dwellings within these zones - as practised at German commercial airports and military airfields according to the Air Traffic Noise Act - would not be a promising method to solve noise problems at general aviation airfields. On the one hand, sound attenuation by usual windows is sufficient for noise protection inside houses in most cases as long as windows are kept closed(what however may also severely impair the quality of life). On the other hand, the annoyance to people outside of their dwellings (backyards, balconies etc.) cannot be alleviated by structural sound insulation. As a consequence, it was decided that provisions for the reduction of noise nuisance around general aviation airfields should better contain time restrictions to reduce the number of aircraft operations during the most sensitive hours of the day and incentives to stimulate purchase and use of low-noise aircraft.

This concept was implemented in a statutory decree on time restrictions for operations with light-weight aircraft and powered gliders, which applies to general aviation airfields having registered more than 2o ooo takeoffs and landings in the previous calender year (2). According to the decree, the restrictions apply to non-commercial civil aircraft operations with light-weight aircraft (2ooo kg maximum gross weight), and especially the following types

of flights are restricted:

- o traffic circuit flights
- o training flights with the exception of cross-country training flights
- o round trips and sightseeing flights
- o sign-towing flights
- o takeoffs with towed gliders with the exception of special events e.g. in connection with performance tests, competitions etc.

These types of flights are prohibited on workdays before 7 a.m., between 1 p.m. and 3 p.m. and after sunset, and on sundays and public holidays before 9 a.m. and after 1 p.m..

As an incentive for the development, purchase and operation of low-noise aircraft, light-weight aircraft and powered gliders having noise emission levels of at least 8 db(A) lower than the official certification limits are exempted from these restrictions except in the case of night flights. The names of the airfields falling under the decree are published regularly by the Federal Ministry of Transport on the basis of the official publications of aircraft operations by the Federal Statistical Office. The types of certificated low-noise light-weight aircraft are also published officially by the German Federal Office of Civil Aeronautics. After several years of implementation of the decree it can be stated that - according to the Federal Environmental Agency (3) - there has been a decrease in the number of aircraft operations at the airfields under the decree compared with the airfields with less than 2o ooo operations per year and therefore not under the decree. This means a certain shift of aircraft operations to airfields with a less severe noise impact. Concerning the development of noise emission from light-weight aircraft in the Federal Republic of Germany it was shown that, as soon as in 1978, of all newly certificated light-weight aircraft meeting the official certification requirements, about 3o % of the powered gliders and about 6 % of the other aircraft had emission values of 8 db(A) or more below the official certification limits and may therefore be regarded as low-noise aircraft. There is an increasing trend to produce and offer low-noise aircraft. Aviation clubs are more conscious of the acoustic properties of an aircraft when purchasing a new one. Noise emission values are now practically always included and discussed in the aircraft test reports of the aviation journals. This trend maybe strengthened by the fact that more and more regional airports and general

aviation airfields have introduced split landing fees also for small propeller-driven aircraft with lower fees for low-noise aircraft.

Another sector of flying is at present developing rapidly and becoming more and more important from the viewpoint of noise control: ultralight aircraft. In the Federal Republic of Germany the Federal Ministry of Transport has issued a general disposition (4) stating that these aircraft are subject to type approval in our country. In addition to the necessity of meeting certain safety requirements, an ultralight aircraft for type approval has to keep below a maximum noise level of 6o db(A) measured on the ground during a horizontal overflight at a level of 15o m at full engine speed. Several ultralight aircraft types have already been type-approved. This shows that it is technically possible to meet this requirement.

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