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COMMUNITY RESPONSE TO NOISE FROM LIGHT AIRCRAFT.

D. Smeatham, P.D. Wheeler & G. Kerry

University of Salford, Department of Applied Acoustics, Salford.

1. INTRODUCTION

There is evidence to suggest that people perceive noise from light aircraft differently than noise from jet aircraft. In terms of noise level, annoyance threshold at small general aviation facilities may be lower for a number of different reasons including, different operation patterns, lower background noise levels and different hours of operation.

The Department of Applied Acoustics at the University of Salford are involved in a project investigating the noise nuisance caused by light aircraft and microlights. Part of this project involves a literature review and a survey of Local Authorities throughout Britain has been carried out to collate their experience in the assessment of this type of noise. The aim of this survey was to focus on the role of the Environmental Health Officers and determine in what form environmental noise impact statements should be prepared with respect to this type of noise. The results from this survey provided a countrywide view of the problems associated with the noise nuisance from light and microlight aircraft and the procedures used to elevate these problems.

The initial part of this paper will review some of the key research on the annoyance due to environmental noise and noise from light aircraft. The remainder of this paper will address the results from the survey of local authorities giving reasons why people become annoyed with light and microlight aircraft, the actions local authorities can take to elevate the problems and the various methods available to deal with complaints.

2. LITERATURE REVIEW

Many researchers have attempted to predict the sound level at which people can be expected to complain about noise sources in the environment.

Shultz [1] analyses data from surveys covering many types of *environmental noise* to establish a level of noise at which people will be annoyed. Using Shultz's estimation method 5% of people will

be highly annoyed with an Ldn[1] of 55dB(A).

Birnie *et al* [2] studies the relationship between noise level and social survey data from *general aviation* airports in Canada and found that an estimated 14% of people will be highly annoyed with a Ldn of 55dB(A).

This hypothesis is confirmed by Harris [3] who carried out a study at eight *general aviation* airports and found that complaints against normal operations started at Ldn 55dB(A) and for "touch and go" operations at Ldn 50dB(A).

An assessment of the annoyance due to noise from *general aviation* with the requirement to establish the difference in public attitude and reaction to business and non-business general aviation sectors [4] concludes that; People perceive different categories of flying and attach very different levels of importance to them and that within the range of noise levels encompassed in the study, reaction to general and business aviation noise are significantly higher than those to air transport. This report also states that 'Although the community annoyance increases with aircraft noise level, aircraft noise level does not play a dominant role in determining community reaction to aircraft noise around general aviation airports.' From the results of this work the authors suggest one possible way of reducing community reactions to aerodromes is to have better communication between the aerodrome and local residents.

From these references it can be seen that people clearly react differently to general aviation noise compared to other types of environmental noise. The uncertainty about the assessment of light aircraft noise led the University of Salford to undertake a survey of Local Authorities to find out how this noise is dealt with in practice in Britain.

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[1] Although the values given in these papers refer to sound levels given in Ldn (Day Night Level), in general light and microlight aircraft rarely fly at night therefore Ldn is equivalent to a day time Leq.

3. SURVEY

A letter was sent to all the Chief Environmental Health Officers in Britain asking them for relevant experience in dealing with the annoyance of microlight and light aircraft. Information was sought regarding:

(1) The use of light aircraft and microlights within the area of the local authority jurisdiction and the history of any complaints.
(2) The procedures adopted by the local authority to deal with the complains and any local planning procedures.
(3) The levels of noise, in the opinion of the local authority at which light and microlight aircraft becomes intrusive. The threshold at which complaints can be expected.
(4) The outcome of any complaints.

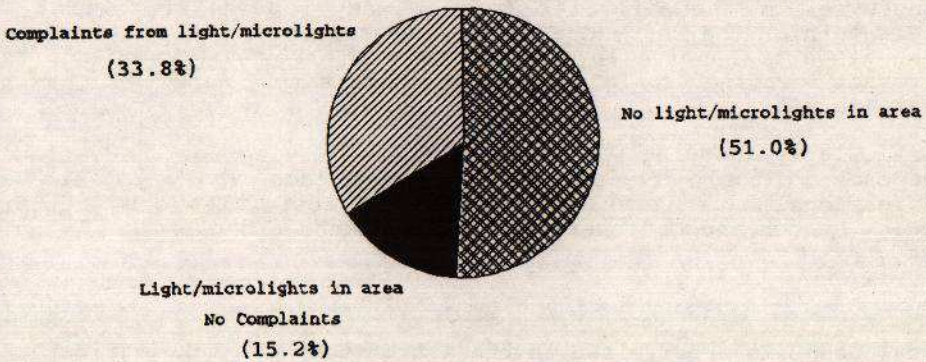

Figure 1 Percentage of replies from Local Authority with experience in light and microlight noise.

4. CAUSES OF ANNOYANCE

Various reasons were given to explain how relatively quiet operations, compared to the noise from major international airports, seem to annoy people. The responses suggest the annoyance of light and microlight aircraft is not only due to the noise level of the aircraft but also the operations and manoeuvres they perform.

4.1 Noise

Information from our survey of Local Authorities suggests that the relatively long duration of fly over and the tonal content of the noise from light and microlight aircrafts make this type of noise annoying. Also, the fact that many of the airfields are situated in rural areas with low background noise levels makes the noise even more intrusive. Many replies stated that where the air traffic is mixed (light aircraft and jet aircraft) the major problem lies with the jet aircraft noise. However, some replies said that where light aircraft is mixed with military jet aircraft complaints against the jets are low compared with the light aircraft due to the acceptance of the need for military flying.

Some local authorities have found that restricting the use of aircraft with three or four propeller blades at airfields can reduce the noise level and hence reduce complaints.

4.2 Operation

We stated above that the annoyance of light and microlight aircraft is not only due to noise nuisance but also the operations and manoeuvres of the aircraft. In fact many replies state that in their opinion the annoyance of the aircraft has very little to do with its actual noise level. Instead the annoyance is due to the aircraft invading people's privacy and the safety aspects of having the aircraft fly at low level over property.

Particularly annoying were thought to be; flying for recreational purposes, circuit flying, the use of roads and airstrips as navigational aids increasing the flying activities over certain areas, "touch and go" operations and weekend and evening flying.

5. PLANNING PERMISSION

Local councils are limited in the action they can take against the use of aerodromes within their jurisdiction. The only action local authorities can take against the use of light and microlight aircraft is to refuse planning permission for airfields or to lay down conditions on the use of the land at the planning stage. Planning permission is required under the Town and Country Planning General Development Order 1988 if the land is used for certain activities for more than 28 days in a calendar year. Therefore the local council can control this sort of activity only if the site is used for more than 28 days a year.

In our survey 20 local councils said they had experience of planning applications. Of these;

six were refused,
nine were approved subject to conditions,
five are ongoing.

RESPONSE TO LIGHT AIRCRAFT

5.1 Planning Permission Refused

Planning permission is in general refused on the grounds that the site would cause environmental damage. Environmental Impact Surveys are conducted to predict the effect on the community from the presence of the airfield. This generally involves both the measurement of the noise levels and meetings to assess the attitude of the local population to the proposals.

It is well recognised that BS4142 is applicable for the assessment of noise levels at residential properties from industrial noise. However in the absence of any other way of assessing the noise at residential property BS4142 has been used to asses the impact of the airfield on local residents in the community. BS4142 says that if the noise level is 5dB Leq above the L_{90} [2] the noise will be noticeable and if the Leq is 10dB above the L_{90} it will cause annoyance. Also if the Leq was above 50dB(A) complaints would be expected.

5.2 Planning Permission Accepted

The only method of controlling the use of airfields is to lay down conditions on which Planning Application is approved. The conditions applied to the planning applications are summarised below.

(1) Limit the number of aircraft movements per day or per year.
(2) Aircraft to use specific flight paths.
(3) Aircraft to reach a certain height before overflying property.
(4) Regular changing of flight patterns.
(5) Restrictions on the type of aircraft that can operate from the airfield.
(6) Restrict flying to certain hours of the day.
(7) Airfield used by club members only.
(8) Restrictions on times when maintenance and testing can be carried out.
(9) Oil and chemicals to be stored correctly.
(10) Airfield to record all movements.
(11) No unauthorised landings from other airports.
(12) No training or instruction to be carried out on airfield.
(13) No "touch and go" operations.
(14) Make records of all take-offs and landings.
(15) Set up a Consultative Committee to deal with complaints.

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[2] L_{90} is statistical parameter which is often used to describe the background noise level. L_{90} is the sound pressure level which is exceeded for 90% of the time.

6. DEALING WITH COMPLAINTS

Although a number of different actions can be taken to deal with complaints from individuals who are annoyed by aircraft noise. The action taken by a local authority varies depending on whether the authority has the relevant experience to deal with the complaint. The actions available include;

(1) Investigation by Environmental Health Officer.
(2) Complaints referred to the Airport Manager.
(3) Complaints referred to the Civil Aviation Authority.
(4) Complaints referred to the British Microlight Association.
(5) Discussions between the Landowner, Club, Airport Manager and Health Officers.

7. CONCLUSIONS

A survey of the experience of Environmental Health Officers in the annoyance of microlight and light aircraft has provided much useful information.

The replies to the circulated letter indicate that annoyance is as much due to the presence of light and microlight aircraft as the noise they produce. Annoyance is also dependent on the type of manoeuvre the aircraft performs, for instance circuits and bumps seem to be more annoying than normal landings and take-offs.

When people do complain about the noise it is its long duration, highly tonal nature which appears to annoy people. The loss of privacy and safety aspects of low level flight annoy people just as much if not more than the noise itself. This implies that when making an environmental impact survey it is important to address such things as the flight paths, the height at which aircraft overfly property, hours of operation and the types of operations carried out on the airfield as well as an assessment of the noise.

Local Authorities have little power to deal with the noise from light and microlight aircraft. The only official way of controlling the situation is to either refuse planning permission or to lay down conditions on planning approvals which limit the use of the airfield. Consultative committees are useful so that local residents and personnel from the airfield can discuss the operation of the airfield.

Complaints from local residents can be dealt with by the local EHO or the Airport Managers or referred to the Civil Aviation Authority or the British Microlight Association.

8. ACKNOWLEDGEMENTS

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9. REFERENCES

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