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OPENING OF NEW RUNWAY AT KINGSFORD SMITH AIRPORT, SYDNEY, AUSTRALIA - ACOUSTIC IMPACT

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1. INTRODUCTION

Kingsford Smith Airport (KSA) is located on the southern perimeter of the metropolitan area of Sydney on the foreshores of Botany Bay. With a total site area of 881 hectares, it is a small airport, slightly larger than Gatwick. It has two intersecting runways, a north-south runway of 3962 metres in length and a shorter east-west runway of 2530 metres. In 1995, it handled approximately 261,000 aircraft movements. Australia has become an increasingly popular destination for tourists over the last decade and it was becoming increasingly obvious that extra capacity was required. Even with the re-location of non-essential aviation to other airports, the two runways would not be sufficient to avoid runway congestion and delays. Accordingly, in March 1989, the Labour government announced the proposed construction of a third runway at KSA, parallel to the existing north-south runway. This was subject to a satisfactory Environmental Impact Statement.

2. ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The method of assessment for prediction of noise impact from aircraft movements is the Australian Noise Exposure Forecast (ANEF). This was developed following a survey carried out in 1980 on 3575 residents living around airports, simultaneously with measurements of the actual noise levels to which they were exposed (1). It is an equivalent energy system, based on aircraft flyover levels and average daily number of events, with a weighting for the night hours, and is somewhat similar to the NEF system previously used in the United States. This system was chosen as providing the best correlation with reaction to noise, although the degree of noise exposure explained only 13% of the variation in reaction, 60 %

being due to other factors such as fear of crashes, general sensitivity to noise, etc. In spite of these limitations, ANEF was found to be the best predictor out of those considered and superior to, for instance, 'peak' level.

Areas outside ANEF 20 are not considered to have any land use implications within the context of Australian Standard 2021-1994, "Acoustics - Aircraft Noise Intrusion - Building Siting and Construction", and are considered acceptable for housing, hospitals, schools, etc, without any specific construction requirements. Residents therefore assumed that the ANEF contours could be taken as a guide to the expected noise levels in their area.

On 20 September 1990, a Draft EIS report on the Third Runway was released for public comment. Many submissions were received from the general public, community groups, and persons with expertise in the area of noise, air pollution, safety, etc. It is generally considered that the government paid little weight to these submissions in the final EIS released in October 1991.

3. EFFECTS OF OPENING OF THE THIRD RUNWAY

The third runway began operations on 4 November 1994, the Prime Minister declaring it a 'great day' for Sydney. This was to prove to be definitely not the case. There were immediate cries of outrage from affected residents as far north as 20 km from the airport (in areas which had been shown to be well outside the ANEF 20 zone. Residents to the south, who had been promised a reduction in noise, 'stood out in their yard and cried' (2). Of particular concern to many residents was the loss of Sydney's 'backyard' culture, given the climate which makes for ideal outdoor living for much of the year. The only happy residents were those living under the former East-West runway flight paths as this runway had been virtually closed on the opening of the new North-South parallel runway, except for use in adverse wind conditions.

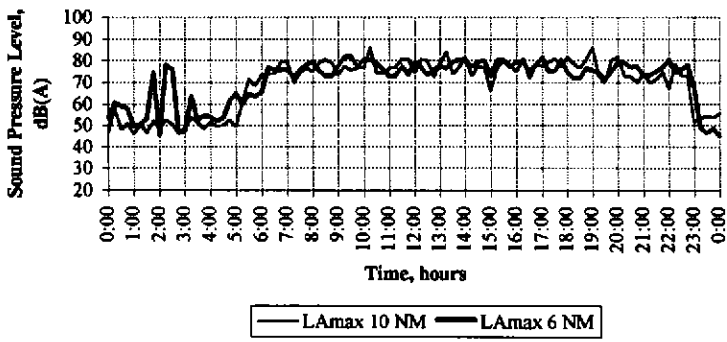
The response was so great that, within days of the new operating procedures coming into effect, the Minister for Transport changed the flight corridors and concentrated the aircraft into narrow strips orientated north and south. He also ordered that the northern gateway to Sydney should be taken out to the 10 nautical mile (NM) point instead of the previous 6 NM. This increased the burden even further for residents immediately below these flight paths, the apparent reasoning being that it was better for 10 people to have their leg amputated than for 1000 to suffer a stubbed toe. For people living in the upper north shore of Sydney, what had been a peaceful environment, with typical evening and early morning ambient levels in the region of 30 to 35 dB(A), turned into a bombardment with plane arrivals at 90 second intervals in peak periods, starting at 6:00 am.

In the following months, resident action groups were formed all over Sydney, local Councils organised blockades of the Airport with up to 10,000 protesters in the early blockades, consisting in the main of people who had never attended a protest in their life. The debacle was seen by many as being due to political machinations, as the effect of the Minister's directions had been to direct aircraft over the electorates of the opposition party.

3. VALIDATION OF RESIDENTS' REACTIONS

A survey of 5000 residents in Ku-ring-gai, an upper north shore area of Sydney, carried out in late 1995 (3), using essentially the same questionnaire as in the earlier National Acoustic Laboratories report, revealed that between 2,600 and 13,000 residents are 'seriously' affected by aircraft noise, and between 9,000 and 44,000 are 'at least moderately' affected, by aircraft noise following the opening of the third runway.
A comparative noise monitoring survey for an area on the boundary of the ANEF 20 zone (6 NM location), with an area assumed to be in less than ANEF 15 zone (10 NM location), has produced measured levels which are almost identical (4). See Fig.1 below showing LAmax noise levels for the same day at both locations. Maximum flyover noise levels were typically above 70 dB(A), frequently above 80 dB(A), with maximum noise levels in the region of 87 dB(A). Predictions of ANEF number based on the measured Ldn levels (Leq with a 10 dB weighting for the hours between 10:00 pm and 7:00 am) indicate that both areas are at the ANEF 20 level (5). In this light, the residents' reactions are hardly surprising.

Fig 1. 15 Minute Statistical Noise Levels
Tuesday 5 December 1995



4. DEFICIENCIES IN ENVIRONMENTAL IMPACT STATEMENT

Leaving aside the problems which the ANEF system may have in predicting noise impact on communities which have never previously been exposed to noise (these will be covered in greater detail by other speakers), there has been a major problem with the prediction of the extent of the ANEF 20 contour to the north of the Airport. There are a number of reasons for this, the main one being that the number of aircraft movements has been significantly higher than expected due to the concentrated flight paths. In addition, the requirement under southerly wind conditions for all arriving aircraft to enter the gateway at the 10 NM location has created a separation problem. World's best practice is to fly in at 210 knots and then make an approach at a constant 3 degree glide scope. The present situation is that aircraft are making their approach at 170 knots which involves a flaps out and thrust on procedure to maintain height, ie, 'flying dirty'. A Boeing 747 cruising at 170 knots at a constant altitude of 3000 ft is estimated to make 4 to 6 decibels more noise than during a constant descent glide slope of 3 degrees. The predictions of the EIS have not taken this factor into account.

In addition, the assessment procedure took no account of land height. It was assumed that Sydney was a flat plane whereas, in fact, it lies in a basin with land heights on the upper north shore at 95 metres and greater above sea level. This adds 1 to 2 decibels to the predicted level.

5. THE FUTURE

At the time of writing this paper, a new Coalition government has come into power and pre-election promises are starting to take place. In the last few weeks, the East-West runway has been re-opened, mainly for traffic out of peak hours, and the concentrated flight paths have been removed, with entry to and exit from the northern gateway now relocated to between the 4 and 6 nautical mile point. A new second airport is planned and the community has recently been invited to make submissions on guidelines for the Environmental Impact Study.

References

Reports:

(1) National Acoustic Laboratories, 'Aircraft Noise In Australia: A Survey of Community Reaction', AGPS, Canberra (1982)

(2) Report of the Senate Select Committee on Aircraft Noise in Sydney, 'Falling on Deaf Ears'. Commonwealth of Australia, November 1995

(3) Dr E Gross, (Macquarie Graduate School of Management) and Dr Ah Boon Sim (University of New South Wales), "Aircraft Noise in Ku-ring-gai: A Survey of Community Reaction", 8 December 1995

(4) V Bray, 'Predicted 2010 ANEF Contours North of Sydney Kingsford Smith Airport. Are They Correct? Comparison of Measured Aircraft Noise Levels at Pymble and Hunters Hill', February 1996

(5) Proposed Third Runway Sydney (Kingsford Smith Airport) - Draft EIS, p 22-18