inter·noise 96
25th Anniversary Congress – Liverpool

INCE: 66

# COMMUNITY RESPONSE TO MAJOR CHANGES IN RUNWAY CONFIGURATION, OPERATING PROCEDURES AND AIRCRAFT NOISE AT SYDNEY AIRPORT

N L Carter (1), R F S Job (2), P Peploe (1), R Taylor (3) & S Morell (3)

(1) National Acoustic Laboratories, Sydney, Australia, (2) Dept of Psychology, University of Sydney, Australia, (3) Department of Public Health, University of Sydney, Australia

## 1. INTRODUCTION

Sydney (Kingsford-Smith) Airport (Australia's major international airport) is located on Botany Bay, five kilometres south of the central business district, and is bordered on three sides by densely populated suburban areas (Fig. 1).

In the 1980s a series of technical inquiries into Sydney's future airport needs concluded that greater airport capacity would be needed in the medium and long term. The Federal Airports Corporation (FAC), a Federal Government instrumentality with responsibility for managing Australia's airports, proposed that a parallel runway (hereinafter called the Third Runway) be built, one kilometre east of the North-South Runway. In the long term, a second international airport was to be built at Badgery's Creek, west of Sydney. An EIS for the Third Runway was accepted by the Federal Government, and the decision to build it was announced in November 1991.

The airport's location, and the existing noise problem dating from the introduction of long-haul jets in the 1950s and 1960s, combined to guarantee that the new runway would become a focus of media attention, and political activity at local, state and federal level.

There is much theoretical interest in human reaction to changes in environmental noise, compared with that to static noise environments [1;2]. This paper looks briefly at the rationale of the Third Runway, associated changes in aircraft operations and aircraft noise, and overt community response (complaints, protests) in this social context.

## 2. THE STRATEGY

The rationale of the Third Runway was that it would increase the

number of aircraft operations at the airport, while reducing the number of people seriously or moderately affected by aircraft noise.

Under suitable wind conditions the North-South Runway permitted landing and taking off over Botany Bay, whereas the East-West Runway always required aircraft to fly over built up areas (Fig. 1). Using Australian Noise Exposure Forecast (ANEF) contours (Noise Exposure Forecast contours with modified evening/night weightings), and allowing for projected increases in air traffic, it was calculated that an additional north-south runway, by reducing use of the E-W Runway, would decrease the number of people seriously or moderately affected from 225,000 to 109,000. Parallel operations were also expected to substantially increase the airport's capacity - from about 55 to 80 per hour.

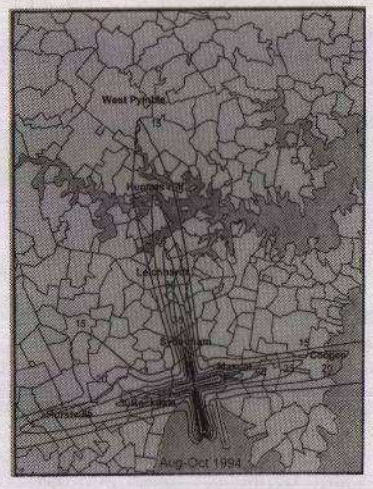
It was recognised by the FAC that noise exposure would increase in certain already affected areas to the north of the airport. Accordingly, owners of properties within the projected 40 ANEF contour (ANEF $\geq$ 40) were given the option of selling to the Federal Government. Those where ANEF $\geq$ 30 were offered sound insulation. It was also planned to insulate schools, child-care and health-care centres in these areas. These measures were to be financed by a levy of A$3.40 on each passenger arriving in Sydney by jet aircraft.

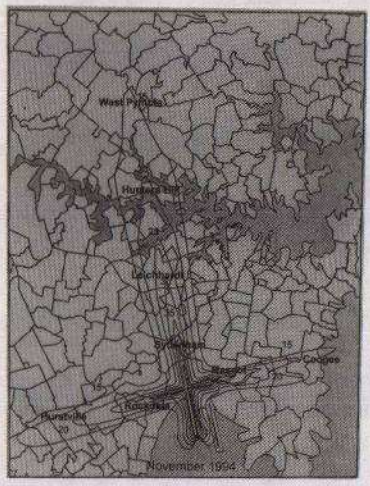
## 3. CHANGES IN NOISE EXPOSURE

Figure 1 gives the Australian Noise Exposure Index (ANEI) contours for August - October 1994. These contours were calculated using the (U.S.) Federal Aviation Authority's Integrated Noise Model (INM), validated against the National Acoustic Laboratories' Sydney Aircraft Noise Exposure Index (SANEI), itself based on extensive aircraft noise measurements made in the area over the past two years. Usage of both the East-West and North-South Runways indicated by Fig. 1 is typical of Sydney Airport prior to opening of the Third Runway.

The Third Runway was opened by the Prime Minister and Minister for Transport on 4 November 1994, seven months ahead of schedule. The new control tower, which would permit improved visual surveillance of all three runways, was not yet completed. Take-offs to the north from the new runway were not allowed. Initially only non-jet and business jet aircraft were allowed to land, with commercial jet aircraft permitted from April 1995. However, at the direction of the Minister For Transport, simultaneous operation of the E-W and N-S Runways ceased on 23 December 1994, resulting in increased use of the existing N-S Runway. The E-W Runway was to be used only in emergencies and when weather conditions required.

Figure 2 gives ANEI contours, calculated as before, for November 1994. Unseasonal winds forced considerable use of the E-W Runway during November, and this is reflected in the ANEI contours of Fig. 2. Nevertheless, Government policy contributed to the extended and widened contours to the north. Contours to the south are not shown, although a small community near the entrance to Botany Bay is overflown by landings from that direction.




Much of the initial overt community response (described below) appeared to be directed at the spread of the noise due to aircraft turning toward their destination as soon as possible after take-off. Accordingly, in November 1994 the Minister directed that aircraft be required to maintain their heading for 6-8 nm after northern take-offs, and, when landing from the north, to join the final approach path no closer than 6 nm from threshold. The effect of this directive and the ban on simultaneous operations on N-S and E-W Runways from 23 December 1994 is shown in the ANEI contours for May 1995 (Fig. 3). Commercial jet landings from the north onto the new runway commenced on 2 April 1995. All of these measures had their effect, reflected in further narrowing and extension of the contours to the north, with minimal aircraft noise exposure in suburbs to the east and west of the airport. Further extension of the contours occurred after the new tower was commissioned in January 1996, permitting independent jet approaches to both N-S runways.

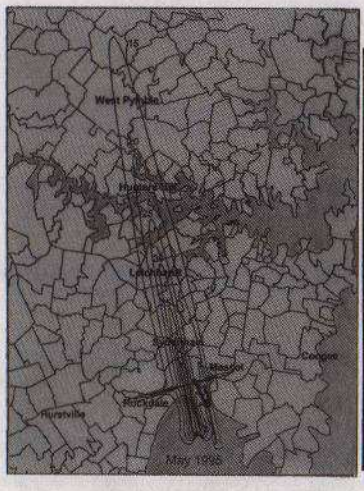



Fig. 3. ANEI, May 1995

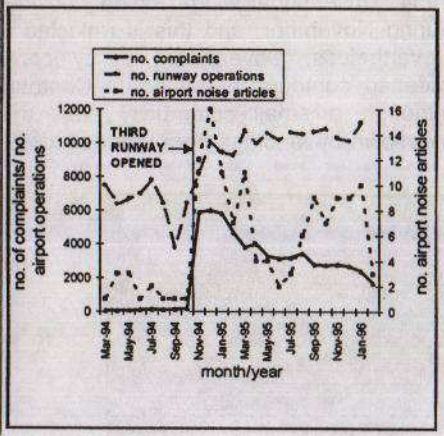



Fig. 4. Numbers of complaints, newspaper articles and northern aircraft movements, March 1994-February 1996

## 4. COMPLAINTS, PROTESTS

Public response to opening of the Third Runway was intense. Telephoned complaints to the FAC about aircraft noise increased from about 200 per month before the Runway was opened to 6,000 per month immediately after its opening (Fig. 4). In December 1995 the first large scale public meeting protesting against the Runway was held, followed a week later by a demonstration and 'blockade' of the international terminal at Sydney Airport. Five more blockades were staged in the ensuing year, organised by the Coalition of Councils, a body comprising the mayors of eleven local governments to the north of Sydney Airport. Local protest groups were formed in Sydney's northern suburbs, areas which had not notably responded to aircraft noise in the past.

In February 1995 the No Aircraft Noise Party (NAN) was formed to field candidates in the NSW State election to be held in March 1995, and the Federal election due in 1996. NAN's policy centred on closing Sydney Airport and fast-tracking construction of the new airport at Badgerys' Creek.

The response of the major political parties was immediate. In March 1995 the Federal Opposition and the Australian Democrats combined to force the Senate to hold a public inquiry into aircraft noise in Sydney. Studies of the effects of aircraft noise on health were promised by the incumbent State Government. The Federal Opposition announced a policy incorporating re-opening of the E-W Runway (to 'share the noise') and early construction of Badgerys' Creek Airport. The Government responded with operational changes designed to mitigate noise, and claimed that unrestricted reopening of the E-W Runway would compromise safety.

All of these events, as well as property acquisitions and building insulation, effects on property values, the policies of the airlines in relation to the hypothetical move to Badgerys' Creek, protests of residents in the Badgerys' Creek area to the prospect of aircraft noise, economic implications, and the personalities involved in these controversies, were closely reported and discussed in the media.

## 5. INTERPRETATION OF OVERT COMMUNITY RESPONSE

### Interacting Factors In Overt Community Response

It may reasonably be surmised that the fairly extreme public reactions, and the continuing controversy in Sydney over noise associated with the Third Runway are due to the operation and interaction of three main factors. These are: (i) preexisting dissatisfaction with aircraft noise; (ii) media (and political) attention to the issue; (iii) the amplifying effect on annoyance of change (increase) in aircraft noise.

### Preexisting Dissatisfaction With Aircraft Noise.

A survey of community reaction to long-standing aircraft noise, carried out in 1980-1982 [3], indicated widespread dissatisfaction in Sydney with aircraft noise. At ANEF 20, 12% of respondents were seriously affected, while 46% reported that they were at least moderately affected by aircraft noise. The ANEF contours shown in Fig. 1 can be used to indicate the extent of this dissatisfaction just before opening of the Third Runway, but only if it is assumed that they (the contours) were still valid in 1994.

### Role Of The Media.

There is some evidence that media reporting interacted with (encouraged, and in turn responded to) overt community response. Figure 4 shows the number of articles in Sydney's largest daily newspaper (The Sydney Morning Herald) concerned with aircraft noise, for each month from March 1994 to February 1996. Also shown are the monthly number of telephoned complaints to the FAC about aircraft noise and the number of large jet aircraft movements landing from and

taking off to the north during the same period. The sharp increase in the number of complaints associated with opening the Third Runway is very similar to the increase in the number of airport-related newspaper articles, whereas the number of aircraft movements shows a more gradual increase over the same period.

**The Effects Of Change And The Ethic Of A 'Fair Go'.**
Dissatisfaction with higher levels of noise is greater when the higher levels occur as a perceptible change in the noise environment [1], possibly due to changes in attitude to the noise source and/or in noise sensitivity [2]. In Sydney, allegations in the media that politicians were manipulating runway usage for their own electoral advantage, and reports of the reluctance of airlines to move to the proposed new airport could also have affected attitudes to the government and the aviation industry and potentiated the effects of change of noise exposure on community response.

Decreased noise under the E-W Runway accompanied increased noise to the north. This was regarded by some as 'unfair'. Understandably, little was heard from people in suburbs under the E-W Runway. It may be pertinent that stress responses are greatest when people believe that others are able to control noise levels when they themselves cannot [4].

## 6. CONCLUSION

Complaints and demonstrations about noise from Sydney Airport may diminish as the failure of these tactics to produce substantial amelioration in the short term becomes apparent (cf. Fig. 4). Whether they are replaced by long term political action remains to be seen. Research specifically directed at noise reaction (annoyance, dissatisfaction) is required to determine whether events of the past two years have resulted in permanent changes in community sensitivity to aircraft noise in Sydney.

**References**
[1] G. J. Raw and I. D. Griffiths, J. Sound Vib. 101, 273 (1985).
[2] R. F. S. Job, J. Sound Vib. 126, 550 (1988)
[3] A. J. Hede and R. Bullen, 'Aircraft noise in Australia; A survey of comunity reaction'. NAL Report 88 (1982).
[4] D. C. Glass and J. E. Singer, Urban Stress (Academic, New York, 1972).

**Acknowledgements**
The Federal Airports Corporation supplied the data on number of telephoned complaints. Air Services Australia provided the information on number of aircraft movements.