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CHANGES IN PEOPLE'S ATTITUDES TOWARD AIRPORT RESULTING FROM DECREASE IN NUMBER OF FLIGHTS

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1. INTRODUCTION

In this paper is discussed changes in people's reaction toward airport, resulting from decrease of noise exposure at Osaka International Airport (OIA), which is one of the primary airports in Japan and is located in the midst of city area of the second largest city Osaka. A small social survey using postal questionnaires was fulfilled in last spring of 1996 to inquire changes of people's response to airport noise on the occasion of one year after the opening of Kansai International Airport (KIA).

First Phase of Noise Reduction at OIA. In the middle of 1960's, complaints against airport noise became very serious after the introduction of jet aircraft into service at OIA. Several lawsuits were raised from residents against the Government from 1969 through 1974. After a long court discussion, the Government paid indemnity of a total of 3415 million yen to the accusers as compensation for past damage from 1981 to 1986 and has fulfilled various countermeasures such as noise limits, night curfew (9 pm - 7 am), flight procedure control reducing noise radiation and so on. Of all such measures, control of airplane operations (maximum limit; a total of 370 all airplane operations and 200 jet airplane operations a day) started from 1977 was the most effective, resulting in noticeable decrease of noise exposure around the airport in cooperation with the introduction of noise certified low noise airplanes (see Fig.1).

Second Phase of Noise Reduction at OIA. In the meantime the Ministry of Transport investigated, from various viewpoints, the possibility to construct an international airport free from noise problems and available 24 hour without night curfew, and the construction of Kansai International Airport (KIA) has been started on a reclaimed island 5 kilometers offshore of Sensyu area in the south-east part of Osaka Bay since 1987. The first stage of the construction was completed and the airport has been opened

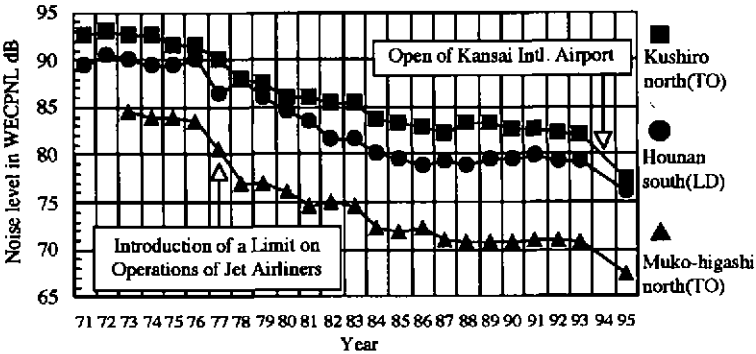

Fig.1 Changes of yearly average noise levels (WECPNL) observed at three site locations by an unattended noise monitoring system.

since September 1994 [1]. In consequence, airport activities at OIA have decreased to 62% of all airplane operations (or to 70% of jet aircraft operations), because most airplane operations for international air traffic have moved to KIA. It has brought rapid and drastic noise reduction.

Continuation of OIA. Noise level observed in the surrounding of the airport has gone down more than 15 dB in WECPNL through the above two phases of noise reduction (Fig.1). However, up to now, few words are heard from inhabitants about such a great deal of noise reduction by administrative endeavors. On the other hand, in spite of the initial request of the residents who had asked the Government to close OIA after the opening of KIA, it was decided to continue OIA activities by the request of local authorities surrounding the airport, basically from economical viewpoints. A large social survey was done by the Government in order to investigate whether the airport should be continued or not in 1989 [2]. About 3000 replies from eight neighboring cities were obtained and, to the surprise of all, more than 60% of respondents suffering from severe noise exposure (WECPNL (W) ≥ 95) did not deny the continuation. The rate of positive affirmation for continuation was 27% where W ≥ 95 dB, 35% (W ≥ 90) and 42% (W ≥ 75). On the other, the rate of requiring abolition was 21% where W ≥ 95 dB, 15% (W ≥ 90) and 6% (W ≥ 75).

In January 1995, there was a severe earthquake (Hanshin Earthquake) in a wide area of Osaka and Kobe ,including the surroundings (the north west part) of OIA. It caused heavy damage to people, houses and buildings and ground traffics. It might have caused changes in the status of noise exposure and people's attitude to the airport.

2. THE DETAIL OF THE SURVEY

Social Survey Methodology

The social survey was carried out by mail at ten selected areas (in the vicinity of OIA), where many people were subjected to airplane flyover

noise. Each area is a region of 200 - 500 m wide by 200 - 500 m long and is located close to one of eleven remote stations of an unattended noise monitoring system installed by the Government. Six areas are in the north part of the airport and four in the south. Questionnaires were mailed to 550 addresses in total (350 in the north and 200 in the south) in the middle of last January. In 2-3 weeks 215 replies were obtained (148 for takeoff and 67 for landing), resulting in a response rate of 39%.

Questionnaire Development

The questionnaire of social survey was compiled basically in accordance with the format recommended by the Acoustical Society of Japan [3]. Attention was paid to the way of questions so that respondents were properly aware of the purpose of social survey. If they misunderstood it as political purpose, they might be afraid of causing changeover of the administrative policy and not reveal their real mind, due to the long history of noise issues at OIA. Therefore, respondents were informed such that the aim was scientific investigation of general living environment and that questionnaires were mailed to many people in a wide area covering Osaka and Kobe. They could imagine at most that the aim was to investigate general influence of transportation noise on their living environment.

Estimation of Noise Levels

Noise levels were estimated from calculation using a prediction model together with results of observation by the unattended monitoring system, because addresses of the respondents were scattered certainly around remote monitoring stations. Each survey area was divided into smaller regions of about 50 m wide by 50 m long and noise levels were estimated at the center of those regions. According to the result of estimation, noise levels (WECPNL) in the survey areas were 66 - 88 dB in the north and 66 - 88 dB in the south after the opening of KIA and were approximately 3 - 5 dB (north) and 3 dB (south) lower than those before the opening of KIA. Note that airplane operations of large jet aircraft decreased 28.6%.

3. THE RESULT

Description of Respondents and their Dwelling

The sample was composed of men (70%) and elderly persons; '40-60 years' (46%) and 'elder than 60 years' (46%) of all respondents. Occupations are salaried employees (42%), housewives (17%) and non working persons (23%). 86% dwell at the same place longer than 10 years and 6% longer than 5 years. 86% of their dwellings are detached wooden houses; one story (11%) and 2-3 stories (88%). 25% of their households included noise sensitive members such as sick, infant or night-working persons.

Impression with Living Environment

Respondents were asked, from various aspects, to answer whether they were satisfied with their living environment. The percent of dissatisfaction (the sum of 'a little' and 'very much' dissatisfied) was 55% for quietness, 33% for air cleanness, 26% for richness of natural greenery, 23% for traffic

convenience, 23% for shopping and 26% for general impression. But, when they were asked to select just one factor on which they laid stress with condition for living environment, quietness was chosen only by 16%. In responding to another question asking which they felt more important for living environment between convenience of daily life and richness of green and trees, 60% considered the latter to be more important.

Reaction of Respondents to Noises heard in their Area

A series of questions were asked about various specific noises heard. Respondents, who heard a noise, gave together the degree of bother it caused. 98% of all respondents heard aircraft noise and 73% felt bothered (the sum of 'a little' and 'very much' bothered), while road traffic noise (81%/23%), railway noise (29%/10%), factory noise (24%/7%), building-work noise (41%/12%), neighborhood sound such as cry of pets and karaoke (44%/12%) and reckless driving of motorbikes (9%/7%). Next, They were asked which of the noises heard they regarded as the most bothersome; aircraft noise was chosen by 61%, road traffic noise by 12% , railway noise by 6%. The third was a question asking how much annoying were the noises which they answered the most bothersome using a 5-step scale. Of those who said aircraft noise as the most annoying noise, i.e. 61% of all the respondents, 24% were a little annoyed, 23% moderately annoyed, 28% very annoyed and 15% extremely annoyed.

Long-term Changes of Quietness in their Area

Respondents were asked to answer whether they felt their area was so noisy as before (10 years ago and 5 years ago). Reaction showed dispersion among categories, although the rate of answers 'the same as before' increased by 2% and 'became noisier' decreased by 6% from 10 years ago to 5 years ago. It seems to be a little difficult to judge such a long-term change.

'Now' vs. '10 years ago'. 7% gave no answer, 27% 'became quieter', 30% 'the same as before', 32% 'became noisier' and 'don't determine' 4%.

'Now' vs. '5 years ago'. 13% gave no answer, 27% 'became quieter', 32% 'the same as before', 24% 'became noisier' and 'don't determine' 4%.

Changes of Traffic Noisiness before and after the Opening of KIA

Respondents were asked whether noisiness of transportation noise heard in their neighborhood changed or not, when comparing it before and after the opening of KIA. As shown in Fig.2, 72% answered 'became quieter' about airport noise, but only 1% road traffic noise and 4% railway noise. On the other, more than half answered 'the same as before' for road traffic (66%) and railway (52%), while 22% for aircraft. Moreover, 12% answered road traffic became noisier , while 1% aircraft and 2% railway.

Change of Traffic Noisiness before and after the Earthquake

Respondents were asked whether noisiness of transportation changed or not, when comparing it before and after Hanshin Earthquake. More than half answered 'the same as before' for all (aircraft 67%, road traffic 66% and railway 56%), but 18% answered 'became noisier' for road traffic and 19% answered 'became quieter' for aircraft.

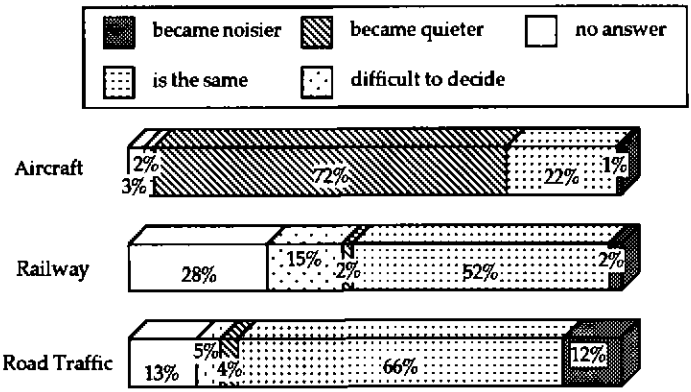

Fig.2 Changes of noisiness of Transportation noises between before and after the opening of KIA.

4 DISCUSSION

Annoyance and Noise Exposure Level

From the result expressed in the above section, it is found that people seem to be dissatisfied with quietness, although they are fairly satisfied with living environment in general. They feel the most bothered by airport noise. Most people feel that airport noise has 'become quieter' after the opening of KIA, but they consider noise climate has not been so much affected by the Earthquake. One third feel that environment has become noisier compared with '5 or 10 years ago'. The reason may be ascribed to the increase of road traffic noise.

From the result of response of the respondents who answered airport noise as the most bothersome (61% of all respondents), annoyance scores were related to average noise levels WECPNL, which were calculated for each category of the 5 steps. WECPNL was translated to L_{dn} using a measured relation of L_{dn} = WECPNL - 14. The result showed that L_{dn} = 59 - 61 dB corresponds to 'a little - moderately annoyed', 63 dB to 'very annoyed' and 65 dB to 'extremely annoyed'.

Comparison with an earlier survey fulfilled in 1970

A large three-year social survey using interview on living environment was carried out since 1970 around OIA [4]. One of areas investigated in the first year 1970-study (WECPNL≥90) includes survey areas of the present study. Then, 1970-study result (sample size; 309) was compared with the present 1996-study in order to examine changes in people's attitudes toward the airport. The percent rate of general dissatisfaction with their living environment changed from 36% to 26%. The rate of dissatisfaction with aircraft noise was 56% in 1970-study and 73% in 1996-study. The rate of respondents who answered aircraft noise as the most annoying noise was 88% in 1970 and 61% in 1996. Interference with daily life was TV & TEL.

(63% / 1970 and 47% / 1996), conversation (27% / 1970 and 15% / 1996) and general annoyance (46% / 1970 and 42% / 1996). Although, as is shown in Fig.1, noise levels has been decreased more than 15 dB since 1970, people's reaction to airport noise is still severe and the rate of people complaining about airport noise did not change so much.

5. CONCLUDING REMARKS

A social survey of living environment was carried out through mail questionnaires at Osaka International Airport, in order to investigate changes in people's attitudes toward airport on an opportunity that airport operations have reduced to 70 %, accompanied by the opening of Kansai International Airport. Noise exposure level in regions investigated has decreased 3 - 5 dB. In the survey, a total of 215 answers were obtained.

Most of the respondents complained about noisiness, although they were fairly content with their living environments in general. They pointed out the cause was aircraft noise. The way people felt about quietness in general did not show clear change in the course of many years.

The greater part of the respondents answered that aircraft noise became quieter than before the opening of Kansai International Airport. It was, however, found that the rate of people dissatisfied with aircraft noise was still similar to 25 years ago, although noise exposure level was decreased more than 15 dB. The result of the present survey also shows, on the arithmetic average of souns levels, that people are annoyed if L_{dn} of aircraft noise goes over around 60 dB and that their reaction changes to highly annoyed when L_{dn} becomes 63 - 65 dB.

The airport authority of Kansai International Airport has monitored noise exposure at various sites along the coast. Maximum sound levels observed are at most 70 - 75 dBA, resulting in WECPNL of 62 - 64 dB. No complaints are brought now, irrespective of 140 airplane operations a day. Offshore airport construction has proved successful as the last solution to airport noise problems. It has also brought noise reduction around Osaka International Airport. Before starting the present survey, current status of noise issues around Osaka International Airport was asked to some local administrative authority, who said 'People know noise exposure has been decreased, but never refer to it, because it doesn't yields no returns'.

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